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The South Pacific Commission

The South Pacific Commission is an advisory and consultative body set up in 1947 by the six Governments responsible for the administration of island territories in the South Pacific region (Australia, France, the Netherlands, New Zealand, the United Kingdom and the United States of America).

The Commission's purpose is to advise the participating Governments on ways of improving the well-being of the people of the Pacific island territories. It is concerned with health, economic and social matters. Its headquarters are at Nouméa, New Caledonia.

The Commission consists of not more than twelve Commissioners, two from each Government. It normally holds one Session each year. There are two auxiliary bodies, the Research Council and the South Pacific Conference.

There is a Research Council meeting once a year. This may be either a meeting of the full Council, or of one or other of its three main sections, specialising in the fields of health, economic development and social development. Members of the Research Council are appointed by the Commission. They are selected for their special knowledge of the questions with which the Commission is concerned, and the problems of the territories in these fields. The chief function of the Research Council is to advise the Commission on what investigations are necessary. Arrangements to carry out those that are approved are the responsibility of the Secretary-General and other principal officers.

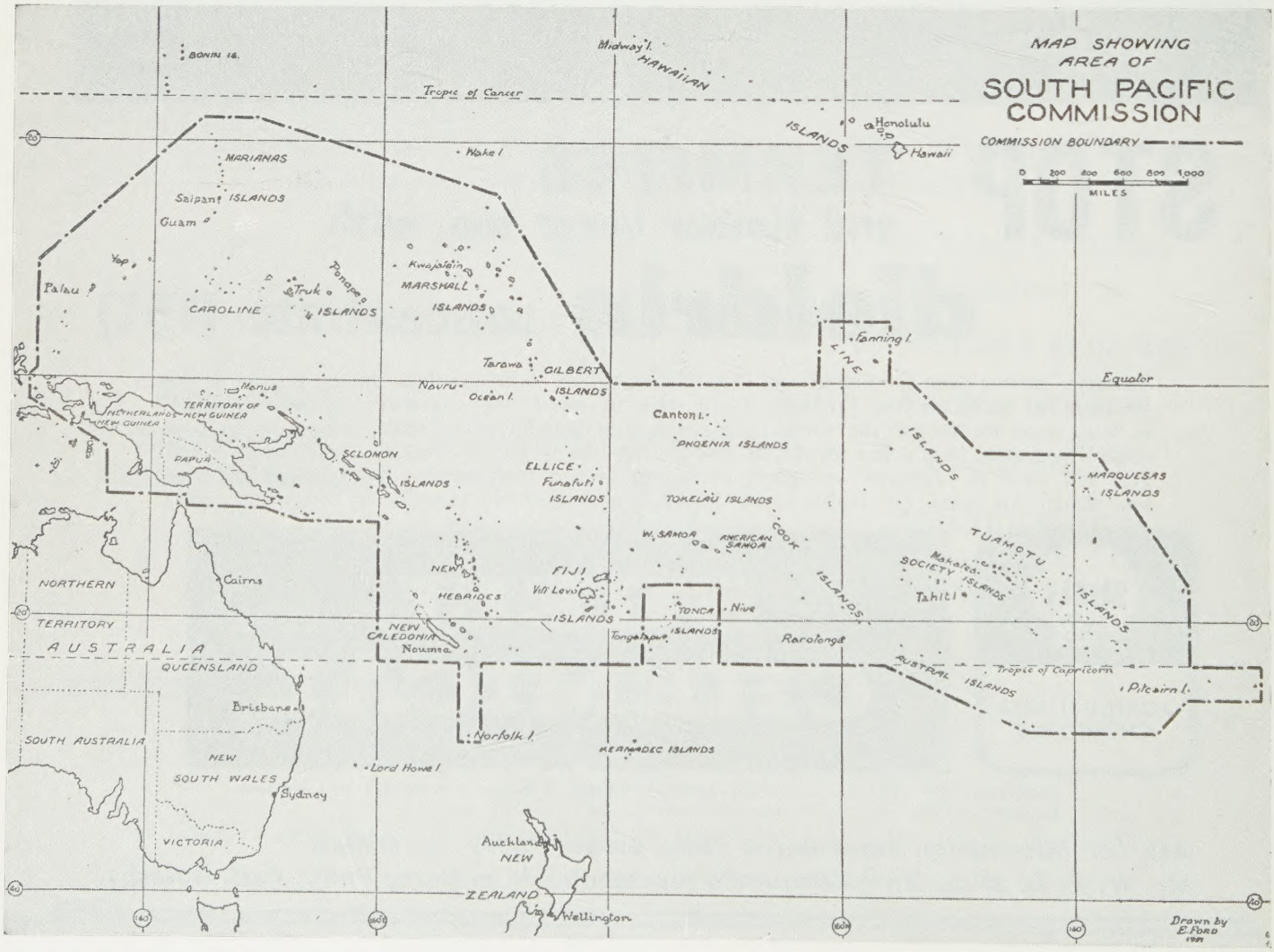
The South Pacific Conference, which meets at intervals not exceeding three years, consists of delegates from the local inhabitants of the territories, who may be accompanied by advisers. The first Conference was held in Fiji in April 1950, and was attended by delegates from fifteen territories and from the Kingdom of Tonga. The second Conference was held at Commission headquarters in April 1953. The third Conference was held in Fiji in April-May 1956, and the fourth Conference in New Britain in April-May 1959.

The principal officers of the Commission are: Secretary-General, Mr. T. R. Smith; Executive Officer for Health, Dr. T. K. Abbott; Executive Officer for Economic Development, Dr. Jacques Barrau; Executive Officer for Social Development, Dr. Richard Seddon. The powers and functions of the Deputy Chairman, Research Council, are exercised by the Secretary-General.

Further particulars of the Commission's activities may be obtained from the Secretary-General, Nouméa, New Caledonia.

FRONT COVER PHOTOGRAPH

Assisted by Aid Post Orderly Ai, Sister E. Longmuir of the Infant, Child and Maternal Health Service in Papua and New Guinea holds a clinic for children at the Kimil Aid Post, in the Western Highlands. In the territory, mobile clinics regularly visit many hundreds of villages, providing a continuous health service for mothers and children living in areas where distance makes it impossible for them to attend the central clinics conducted by the Administration. (See article on page 46.)



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EDITOR: *A. E. Read, B.Sc.*

THE SOUTH PACIFIC BULLETIN, first published in January, 1951, features articles on selected activities in the Commission's three main fields of operation: economic development, health and social development. Articles are also contributed by specialists working in these and related fields, in the territories within the Commission area.

THE BULLETIN is given selective world distribution to people and institutions in widely differing fields sharing a common interest in the purposes and work of the Commission. It is published in two editions, English and French.

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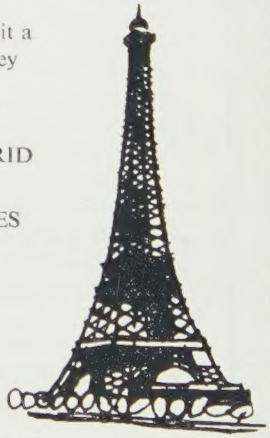

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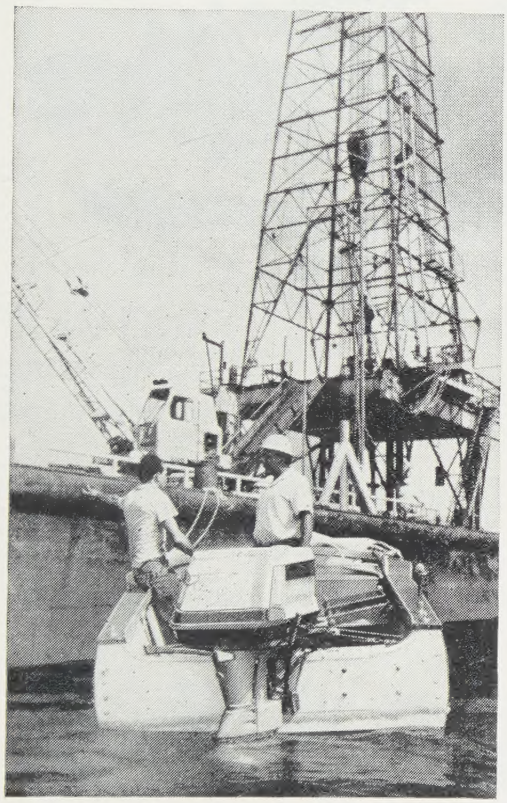

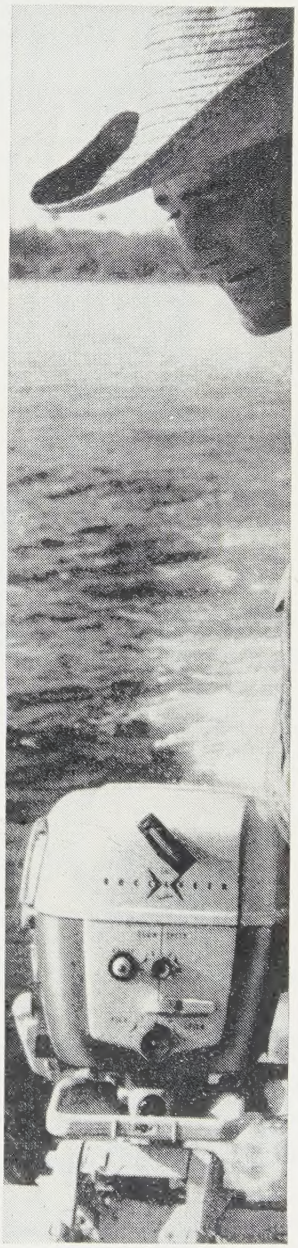

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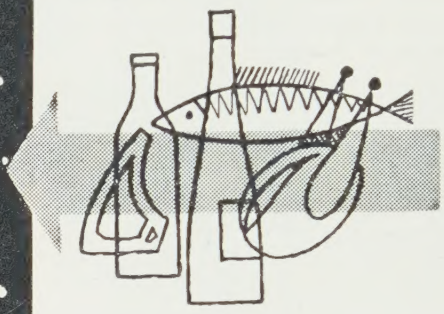

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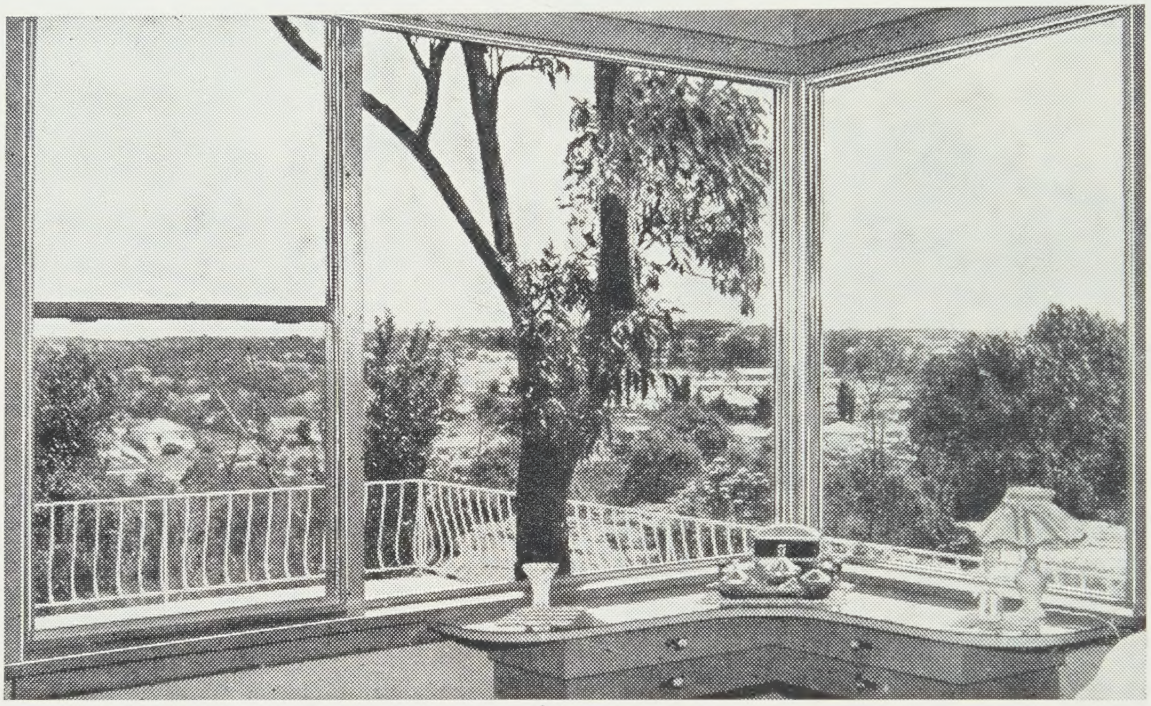

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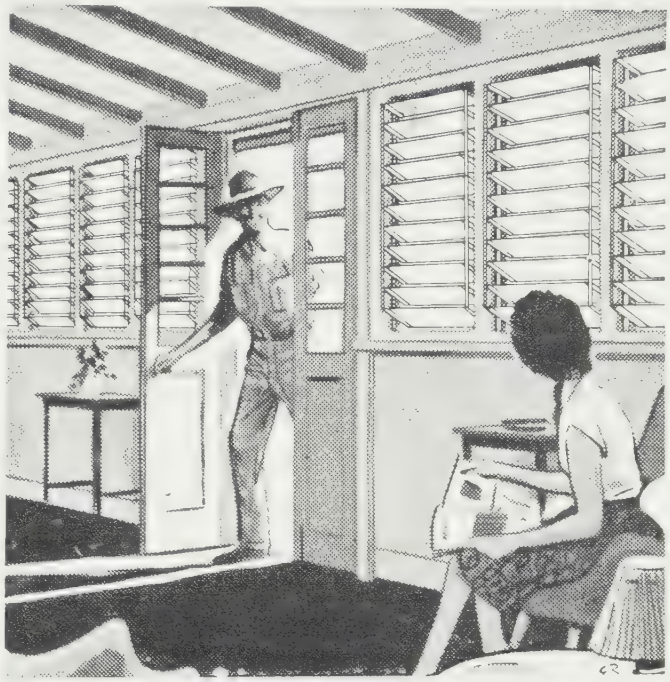

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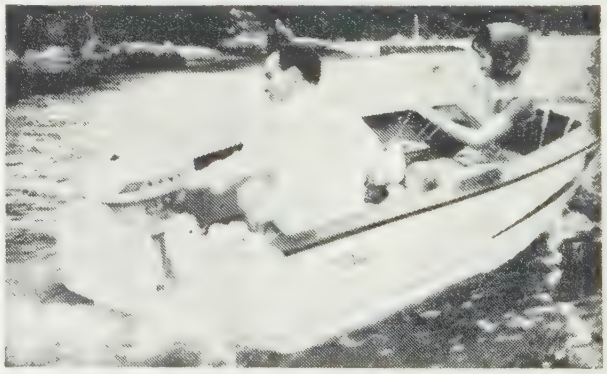

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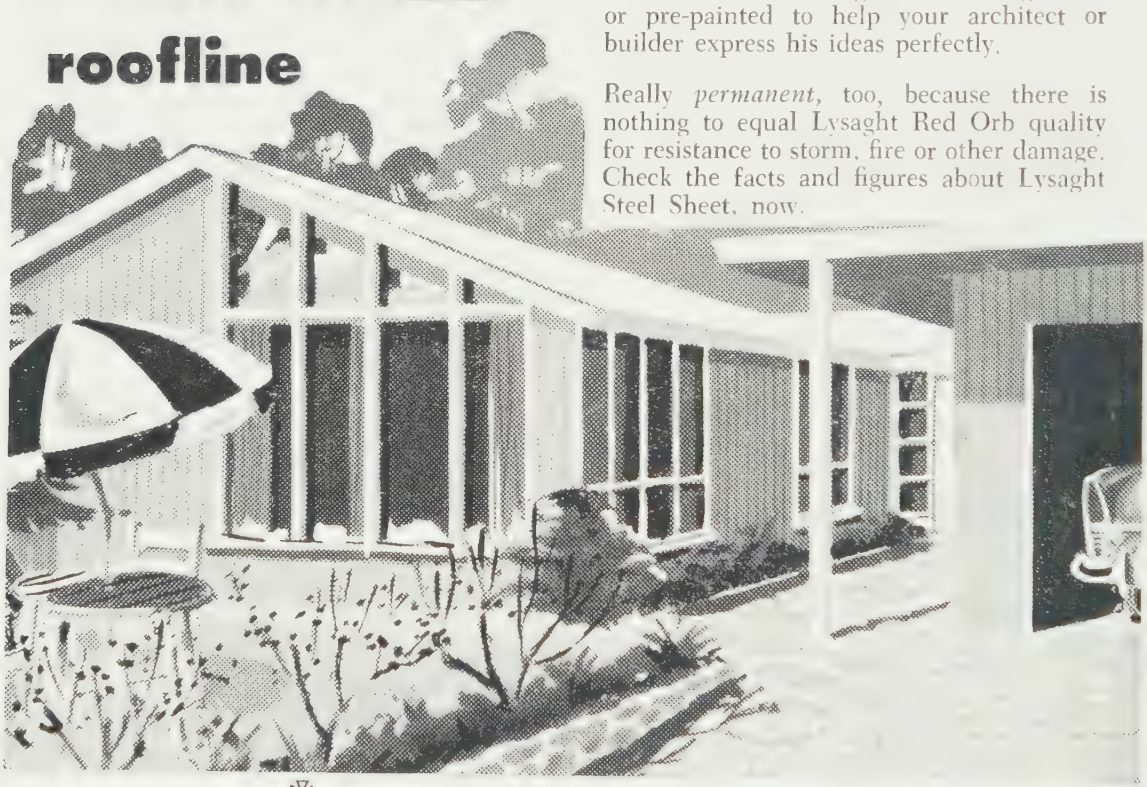

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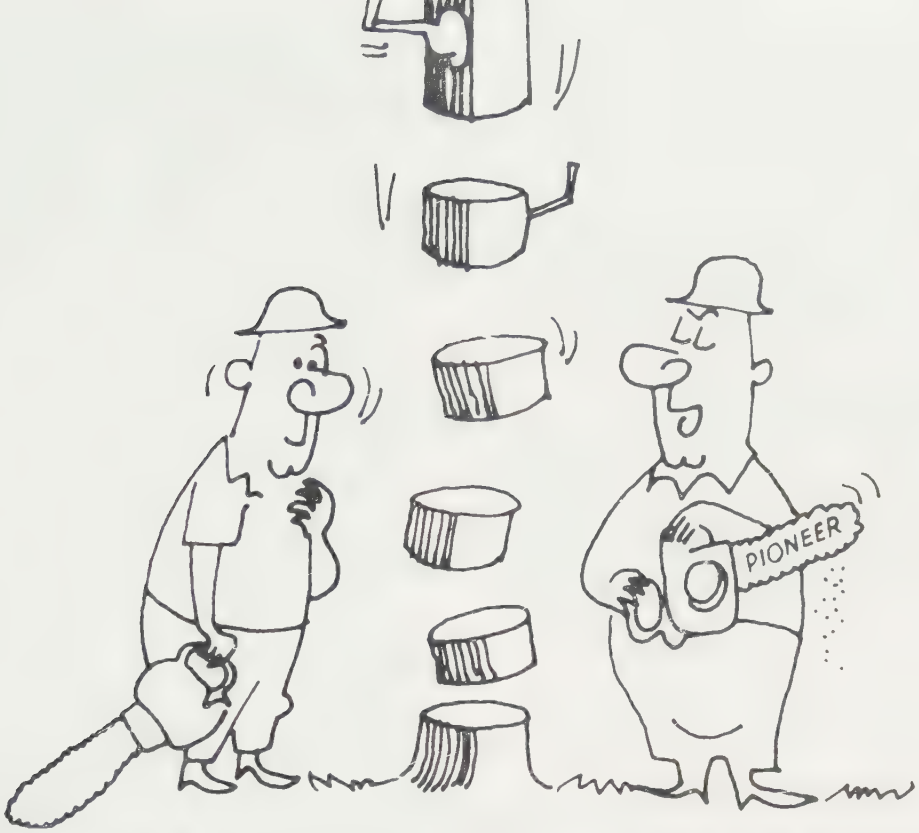

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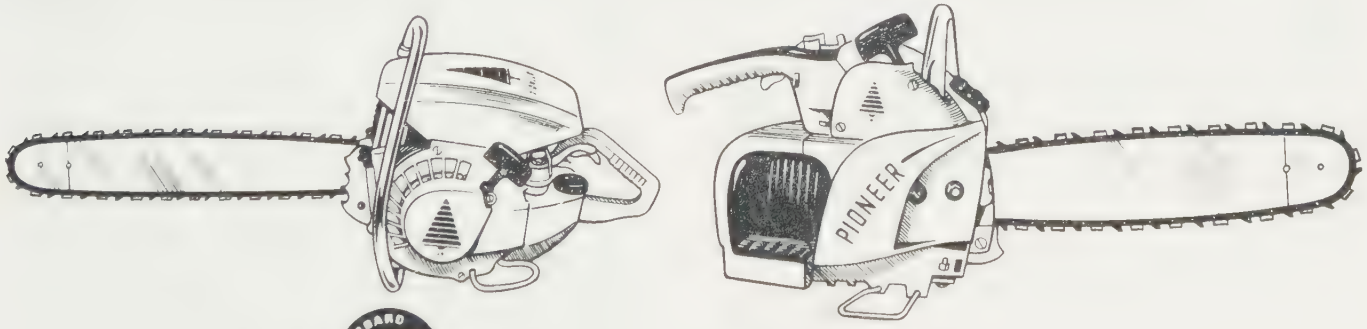

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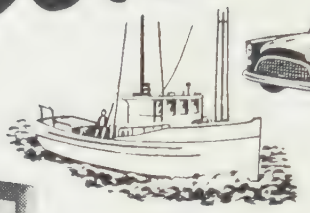

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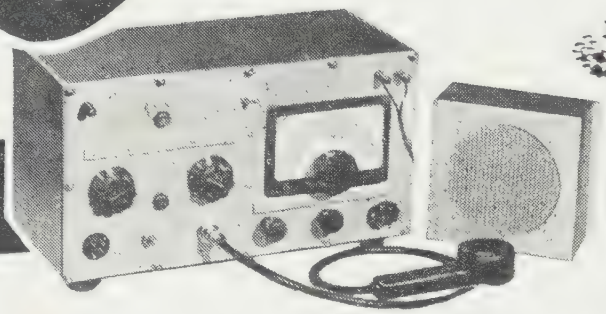

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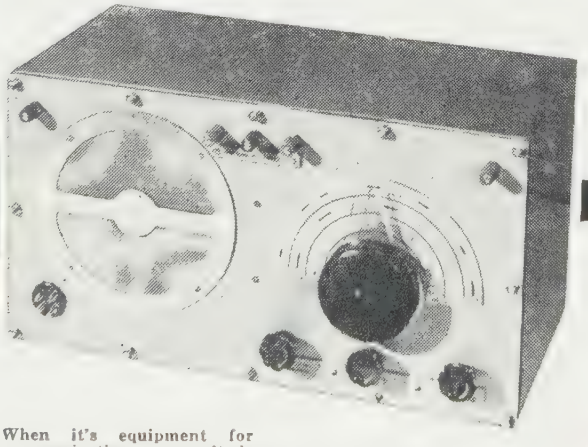

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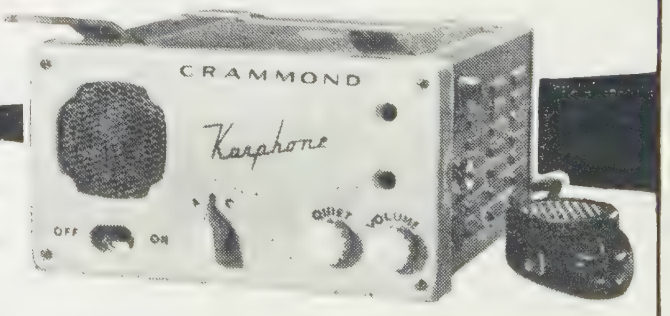

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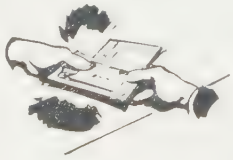

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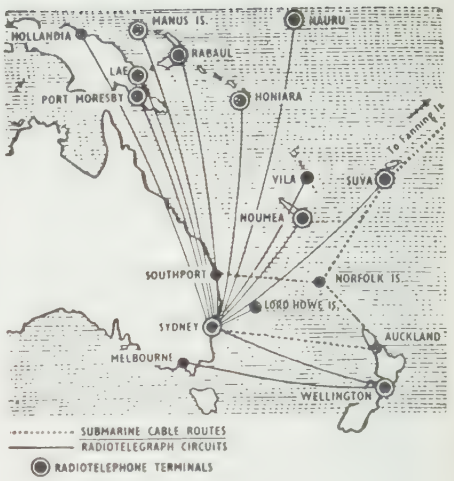

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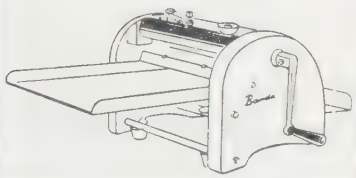

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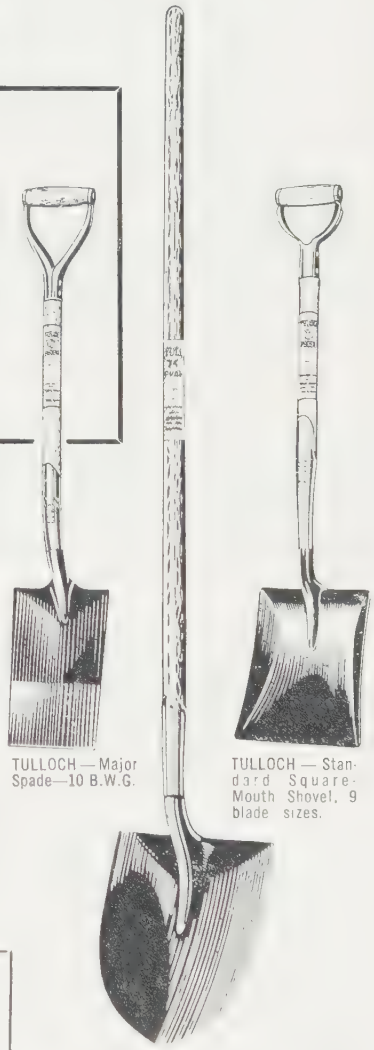

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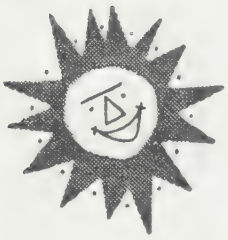

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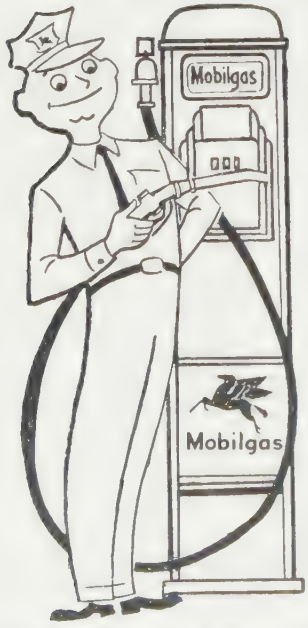

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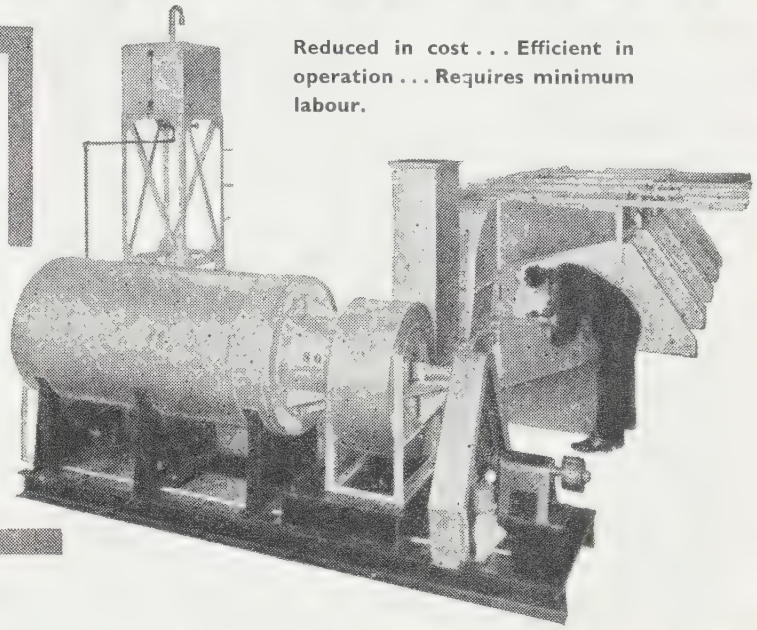

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One of the Station's experimental plots, which are scattered throughout the ninety-mile chain of islets that comprise Rangiroa Atoll.

A few months ago this coconut palm was declining. After perfusion into the trunk of a solution of micro-elements it is now showing definite signs of recovery.

Rangiroa Coconut Research Station

To find practical ways of improving coconut production on the low islands of the Pacific, a coconut research station has been set up on Rangiroa Atoll, in the Tuamotu Group. The South Pacific Commission is actively assisting in its establishment and programme. Following a recent visit to the Station the Commission's executive officer for economic development prepared this article on its purpose and current work.

By JACQUES BARRAU

FROM its inception the South Pacific Commission has been concerned with the problems encountered in crop production on atolls. The peculiar environment of the low, sandy coral islands is, to say the least, not very favourable to agriculture.

Often densely populated, the atolls have only one cash crop, the coconut palm, which is in addition a staple food plant for atoll dwellers. Without it, human life would be impossible on the low islands of the tropical Pacific.

Although this useful tree is a major component of atoll vegetation, it is not at its best on these poor soils, composed as they are almost entirely of coral sand and gravel.

In 1952-1953 Mr. W. V. D. Pieris, then the Commission's expert on the coconut industry, surveyed the possibilities of improving the production of this crop in the South Pacific area. In the course of his survey he visited several atolls in Polynesia and Micronesia, and strongly recommended that experimental work be undertaken to find practical ways of improving coconut production on low islands.

His recommendations were endorsed by the Commission's expert advisory body, the Research Council, and later by the Commission itself.

Atoll Research Station Established

Nothing further was done until 1956, when a proposal was made to establish a coconut research station on an atoll of French Polynesia. The French *Institut de Recherches pour les Huiles et Oléagineux* became interested in the project, and in 1957 sent one of its specialists, Monsieur Y. Fremond, to visit French Polynesia and some other territories in the area to study its possible implementation.[1]

Following preliminary studies made by M. Fremond during his field trip, it was decided to establish the station on the large atoll of Rangiroa, in the Tuamotu Group.

As the research needed was of interest to all atolls in the tropical Pacific, the South Pacific Commission decided to assist in the establishment and work of the Rangiroa station through grants-in-aid amounting to £stg.1,500 for 1959 and £2,000 for 1960.

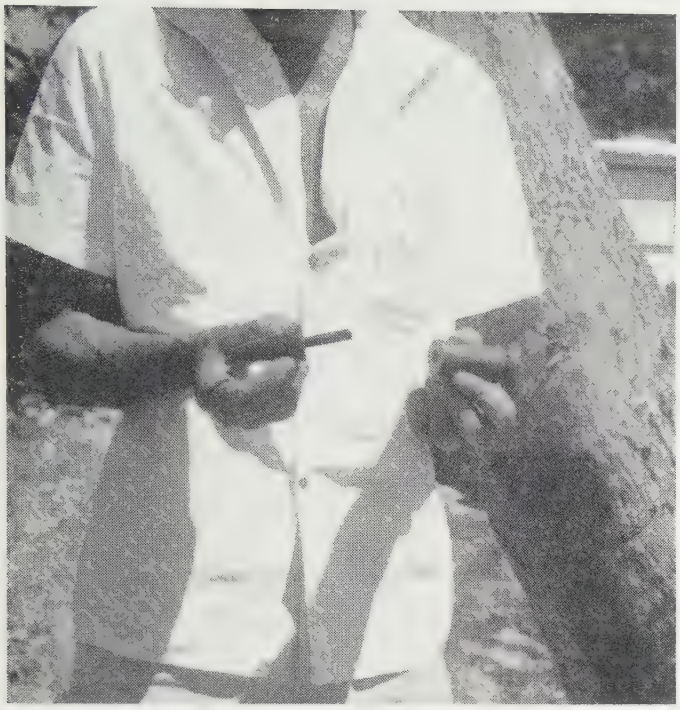
Results Of Preliminary Studies

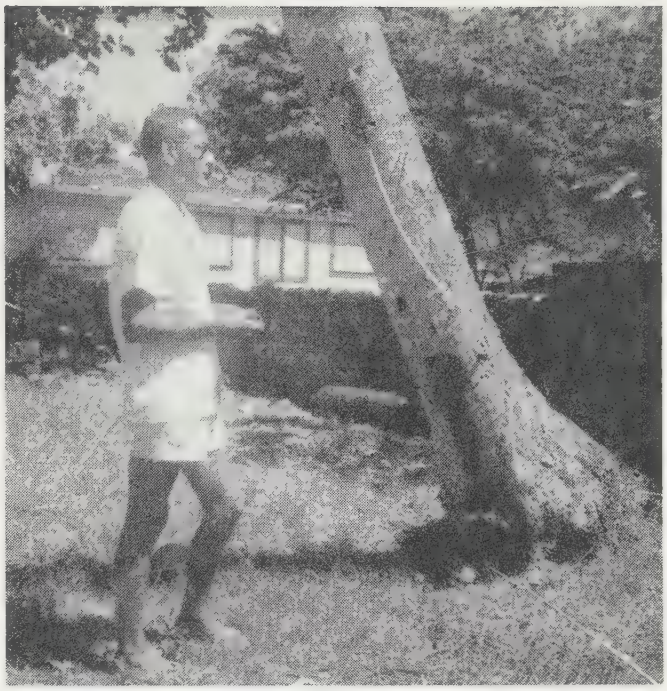
Preliminary studies made on Rangiroa soils and coconut palms indicated that several deficiencies (for instance, nitrogen and trace elements such as iron, manganese, copper and perhaps zinc) were seriously affecting coconut yield. Consequently, in the station's programme priority was given to the search for methods to remedy these micro- and macro-element deficiencies.

In addition, experiments were initiated to study the best techniques for rehabilitating atoll plantations, either by replanting or by thinning over-dense existing groves.

A scheme of coconut palm improvement through breeding and selection was also included in the station's programme.

[1] This Institute was then already engaged in Africa on important research work in the field of coconut agronomy, and M. Fremond was in charge of the main experiment station.





Above: Apparatus for perfusion of micro-elements solution into a palm trunk. The hollow punch (right), slipped over the tube extending from the base of the nozzle, enables the latter to be driven into a hole drilled into the trunk. Right: The container of fertilizer solution is hung on the stem several feet above the nozzle, and is connected to it by plastic tube. At left is Mr. Roger Crivelli, officer in charge of Rangiroa Station.

Many Practical Difficulties

Needless to say, many practical difficulties had to be overcome in the establishment of the station. To begin with, it was only possible to work on the coconut groves owned by the islanders. These were irregularly spaced, and composed of coconut palm populations that were far from homogeneous. It can easily be imagined that the conducting of statistically-orthodox experiments in such an environment was not an easy task.

Furthermore, the chain of islets which composes Rangiroa Atoll is approximately 90 miles long, and encircles a large lagoon where the sea at times can be very rough. As the station's experimental plots are scattered on various islets, transportation was quite a problem. This has been solved by the use of a small speedboat. (Travelling in this craft is quite often an adventurous undertaking.)

A typical soil profile of one of the Station's experimental plots.

The Station's Programme

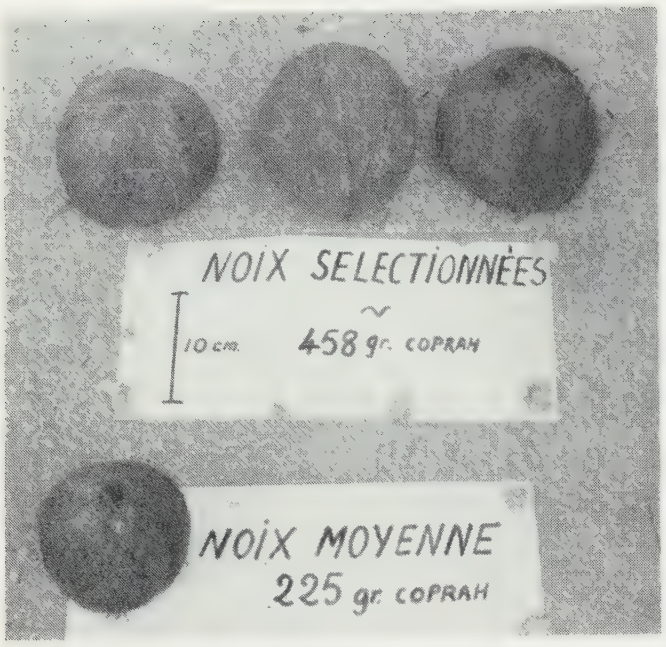
The work of Rangiroa station is devoted entirely to field experiments, ranging from exploratory trials on individual adult trees to experiments on numerous small plots—each consisting of a few adult palms—scattered within one grove. In addition, experiments of a statistically-orthodox design will be undertaken on new plantations now being established.

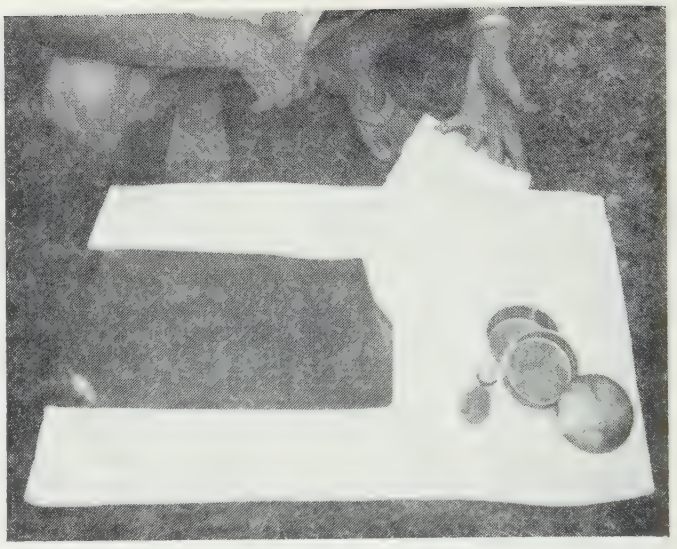
There is no need here to enter into details about the station's programme, as this information is available in its reports. However, a few points are certainly of general interest.

For the exploratory trials on individual trees to combat micro-element deficiencies, one of the techniques used is the injection into the tree of a solution of one or several trace elements. Two of the accompanying photographs show the apparatus used for this purpose, which is quite similar to that commonly used for carrying out blood transfusions.

A hole is drilled at right angles into the trunk and a stout copper nozzle is hammered in, with the aid of a hollow punch fitting over the tube leading from the base of the nozzle. The container with the fertilizer solution is hung on the stem several feet above the nozzle, and is connected to it by a plastic tube.

At first the Rangiroa islanders were sceptical about the experiment, but the rather spectacular results quickly con-





Above: Equipment for the experiments in artificial pollination of coconut palms that the Station will carry out includes pollination bag, sieves and pollen applicator.

Left: Type of seed nut obtained from one of the thirty-four specially selected mother palms on Rangiroa Atoll (top) shown with average nut (below).

vinced them of its usefulness. Within a few months declining trees were showing signs of recovery, particularly those being treated for manganese deficiency.

Statistical Analyses Awaited

For definite conclusions on the present experiments it will be necessary to await the statistical analyses of the first results, which are being carried out at the Paris headquarters of the *Institut de Recherches pour les Huiles et Oléagineux*. However, the present appearance of the treated palms is very encouraging. The positive response by palms being given nitrogen, manganese and iron treatments is particularly striking.

Among other preliminary findings from the first studies on Rangiroa, the question of optimum spacing of coconut palms should be mentioned. It would already seem that, on atolls, a spacing of 23 feet is preferable to the 28 feet generally recommended for the establishment of coconut plantations.

Another interesting aspect of the research work done on Rangiroa concerns the possible methods of modification of the atoll soil reaction, which is commonly alkaline. By the application of sulphur it has been possible to acidify these soils. Investigations are being continued in this field.

Selection Of Mother Palms

As well as the study of seedling selection in nurseries, another important task that has been undertaken is the selection of individual trees for breeding purposes.

Approximately one-third of the total land area of the atoll has been the object of a tree-to-tree survey. Hundreds of palms have thus been carefully studied, using as criteria the number of nuts per tree and the weight of green copra per nut.

In this way, 34 outstanding palms have been selected, and will be used for the station's breeding programme.

This programme includes the production in seed gardens of first-generation hybrids between tall and dwarf palms, and for this work the SPC Plant Introduction Service is arranging to supply the Rangiroa station with dwarf palm seednuts. Artificial cross-pollination will also be undertaken, including the use of imported pollen.

In conclusion, it is hoped that this brief account of the work of the Rangiroa Coconut Research Station gives an idea of the valuable experiments being carried out there to improve coconut production on all atolls in the South Pacific area.

SPC Boatbuilding School For Pacific Islanders Formally Opened In Solomons

A boatbuilding school organized by the South Pacific Commission at Auki, Malaita, in the British Solomon Islands, was formally opened on September 1 by His Excellency Sir John Gutch, K.C.M.G., O.B.E., British High Commissioner for the Western Pacific.

The Secretary-General of the South Pacific Commission was represented by Mr. E. P. W. Marriott, officer in charge of the Commission's Literature Production Training Centre at Honiara.

Twenty-four trainees are attending from six Pacific territories—Papua and New Guinea, British Solomon Islands, Netherlands New Guinea, Gilbert and Ellice Islands, New Hebrides and the United State Trust Territory.

The Bureau of Technical Assistance Operations of the United Nations is actively associated with the Commission in this project.

An account of the opening and description of the school will appear in the next issue of the *South Pacific Bulletin*.

Tenth Pacific Science Congress

The Tenth Pacific Science Congress of the Pacific Science Association will be held at the University of Hawaii, Honolulu, from August 21 to September 6, 1961. It will be sponsored by the National Academy of Sciences, Washington, D.C., and Bernice P. Bishop Museum, with the co-operation of the University of Hawaii. Scientific sessions will be held from August 21 to September 2, with a post-sessional field trip lasting until September 6.

The Pacific Science Association is an international, regional, non-governmental scientific organization, founded in 1920 by the holding of the First Pan-Pacific Scientific Conference in Honolulu. The Association's permanent headquarters are at the Bishop Museum, Honolulu 17, Hawaii, U.S.A.

PROGRAMME: The programme for the Tenth Pacific Science Congress is being organized under Sections and Divisions. Symposia are the main divisional meetings, but provision is also being made for sessions of grouped papers and sessions of contributed papers. In addition to sectional and divisional programmes there will be a limited number of special symposia of broad general interest.

The author (nearest camera) with Forestry Officer Lucien Bernier release the fingerlings after briefly immersing the plastic bags containing them in the lake waters to equalize the temperatures.

American Game Fish For New Caledonia

On July 26, nineteen largemouth black bass fingerlings arrived in New Caledonia by air from Honolulu, and were released the same day in Yaté Lake. This introduction of this well-known American freshwater game fish was arranged by the South Pacific Commission at the request of the Forestry Department of New Caledonia.

By LOUIS DEVAMBEZ*

RIVERS and lakes in the various South Pacific territories are generally poor in indigenous fish, and especially in game species. With the introduction of *Tilapia mossambica* in many islands, a population of small fish was created in rivers and lakes. These tilapia consume large quantities of plants and plankton hitherto wasted, turning them into protein which can be used by man.

However, in the absence of predators other than man, herons and kingfishers, the tilapia are breeding practically unchecked, and vast quantities of them are thus not utilized. The choice of a suitable species of fish that would prey on the tilapia and provide food and sport for man has been debated for some time in several territories.

In one instance at least, a choice has been made. Yaté Lake, in New Caledonia, which is over 9300 acres in area, was stocked a few years ago with tilapia, which now provide food and recreation for many pole-and-line fishermen. The fishing pressure, however, is not sufficient to make any noticeable inroads on this prolific species, and after a careful study of the problem, the territorial Forestry Department decided to introduce some largemouth black bass (*Micropterus salmoides*).

This particular freshwater species was chosen for a number of reasons. First of all, it occurs widely in the United States and Canada, and its ecology has been long studied under a variety of conditions. Thus, while the introduction of a species to a new environment is always—to use a well-worn phrase—fraught with difficulties, in this case unknown factors were at least reduced to a minimum.

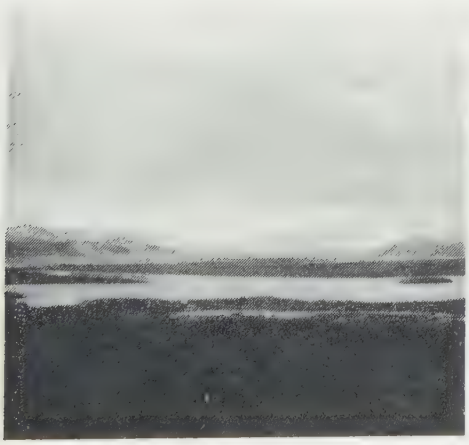
The qualities of the largemouth black bass as a game fish are at least as well known as its ecology, and have repeatedly been highly praised in the many magazines devoted to angling in North America. It is also often mentioned that the black bass is quite worthy of appearing on the family table.

Other characteristics of the largemouth bass are comparatively prolific breeding

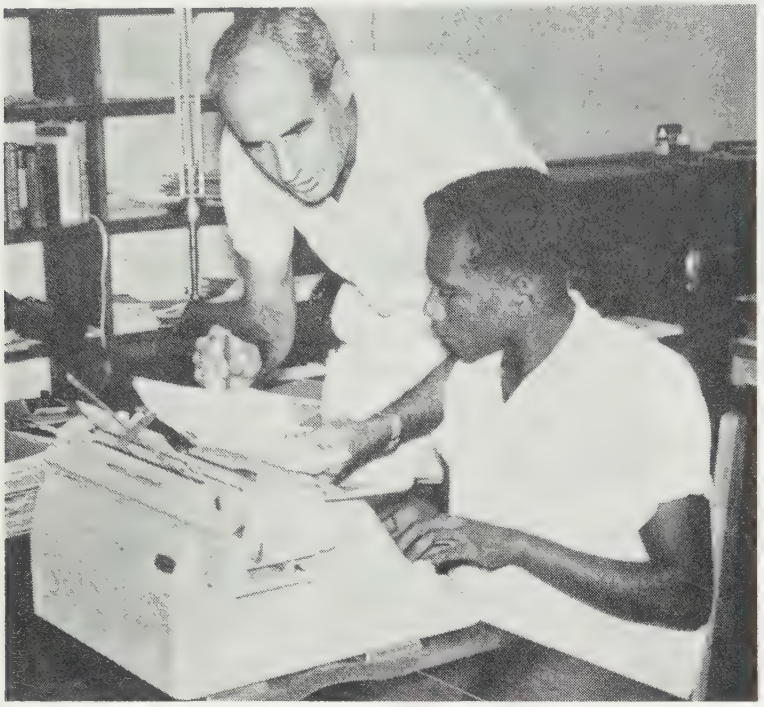
(continued on page 38)

* Assistant Fisheries Officer, South Pacific Commission.

Left to right: Part of Yate Lake, seen from the Plaine du Lac Forestry Station. Forestry Officer Lucien Bernier carrying one of the fish containers down to the lake. Forestry Assistant Gilbert displays a plastic bag of fingerlings.



Literature Production Trainees Make Steady Progress



This account of the first five months of operations at the Commission's Literature Production Training Centre at Honiara in the British Solomon Islands, was prepared by the Editorial/Administrative Officer in charge of the project . . .

E. P. W. MARRIOTT

The author explaining a point in copy preparation to Patrick Paulisbo, from Misima, Papua, whose education included four years at school in Queensland, where he passed his examinations in book-keeping and typing.

ONE of the objectives at the Literature Production Training Centre is to ensure that students are trained in a printery where conditions are similar to those they will be likely to find on their return to their own territories.

These conditions include not only problems of printing in a tropical climate and of working in remote areas where expert servicing facilities are not available, and where the period between ordering printing supplies and receiving them is considerable; they include also meeting the actual day-to-day printing needs of government departments and others under reasonably tight time schedules.

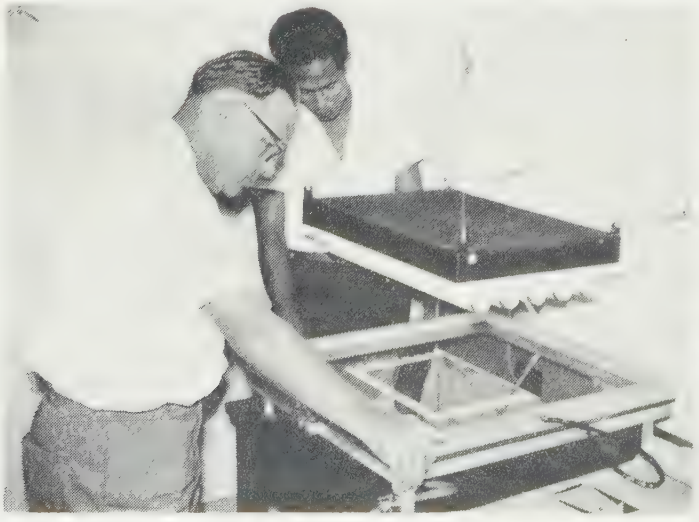
When one bears in mind these problems, especially as they manifested themselves during the first few months' shakedown period, the experience of the first five months becomes interesting.

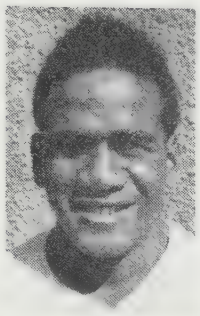
An analysis of the Job Book shows at present a heavy preponderance of forms. In its first five months the Centre handled 80 jobs of this sort, printing an aggregate of 130,000 forms. Of these, rather more than half were short runs printed from direct-image plates, prepared by special typewriter or varityper. The rest were printed from pre-sensitized metal plates, photographed on either the process camera or the Bandavelop.

Work of this nature is excellent training material, as the standard of printing is not as exacting as for literature, and the comparatively short runs provide plenty of practice in setting up the equipment. Nevertheless, experienced printers will know that the production of ruled forms is not always an easy job, and the ability to turn them out quickly and accurately is very valuable.

In twelve of these 80 jobs the forms had to be perforated and stapled in books in duplicate or triplicate. Numbering the pages by hand is rather tedious, but the

Below: Kojrak Caleb of Jaluit, Marshall Islands, with technical production officer A. M. Koenen (nearest camera) printing down on a pre-sensitized offset plate under a source of actinic light. Right: Tearoroa Ariki of Rarotonga lettering with the Varigraph in the Art Department. He has already illustrated several of the booklets produced at the Centre, and shows great promise in this field.

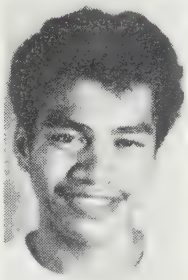




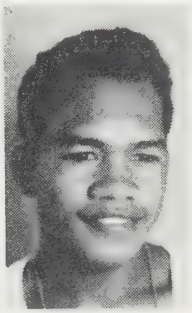
Francis Sunaone

Foliga Fa'arodo

Joseph Samuela



Tearoroa Ariki



Kasiano Qaduadua

Ranu Nihara

SPC LITERATURE PRODUCTION TRAINING CENTRE

Pacific Islands Trainees Attending 1960 Course

BRITISH SOLOMON ISLANDS

FRANCIS SUNAONE, 20, of San Cristobal, British Solomon Islands, came straight from King George VI School, B.S.I.P., where he had reached second year secondary. He has always been interested in engineering, and had thought of becoming a ship's engineer before the opportunity for becoming a printer was offered to him. His plans are to remain with the B.S.I.P. Government Printery after he completes the SPC Course.

FOLIGA FA'ARODO, 19, of Malaita, British Solomon Islands, came straight from Queen Victoria School, Fiji, where he had been for four years and had sat for the Cambridge School Certificate. He is most interested in the plate-making and machining side of the work. His plans are to stay with the B.S.I.P. Government Printery after he finishes the SPC Course.

COOK ISLANDS

JOSEPH SAMUELA, 18, of Rarotonga, Cook Islands, studied printing in the Social Development Section of the Administration for a year after leaving school, gaining experience in offset, letterpress and camera work. At the same time he continued his studies in evening classes. His aim is to return to his previous work, and later to gain further experience with a year or two in the New Zealand Government Printing Office.

TEAROROA ARIKI, 17, of Rarotonga, Cook Islands, worked as an illustrator and cartoonist with the Social Development Section of the Administration for nearly two years after leaving school, during which time he continued his studies in evening classes. At the Centre he has already illustrated several of our small book productions, and shows great promise of developing his talent. He will return to his previous employment in Rarotonga.

FIJI

KASIANO QADUADUA, 20, of Taveuni, Fiji, came straight from St. John's College, Cawaci, Ovalau, where he passed his Fiji Junior Certificate. He is sponsored by the Roman Catholic Mission, and after the SPC Course, and perhaps further experience in the Government Printery, Suva, he intends to set up an offset printery, either as a commercial venture or for the Church.

PAPUA AND NEW GUINEA

RANU NIHARA, 28, of Port Moresby, Papua, was working in the Extension Services Branch of the Administration on the production of *Our News,* a monthly news-sheet in English, Motu and Pidgin. After the SPC Course he hopes to continue with this work, for which offset printing is planned for the future. In 1951 Ranu helped Dr. Belshaw in a social survey of Hanuabada.

JON KONIEL, 20, of Rabaul, New Guinea, trained for a year in the Department of Agriculture before joining the Extension Services Branch of the Administration. He is particularly interested in the preparation of agricultural pamphlets, such as on the right use of the land. He completed his schooling with four years at Ipswich Grammar School, Queensland, where he passed in English and two other 'Junior' exam papers.

PATRICK PAULISBO, 20, of Misima, Papua, worked as a clerk in the Department of Education, Port Moresby, for a year after leaving school. On his return to Papua he will work in the Extension Services Branch of the Administration. He finds all aspects of the work in the Printery interesting, and sees a great need for more school books to be produced at home. Patrick had four years of school in Queensland and passed the 'Junior' in book-keeping and typing.

U.S. TRUST TERRITORY

THEODORE SIGRAH, 22, of Ponape, Caroline Islands, studied printing in the Education Department, Ponape, for three years, including a period of training on letterpress in Suva. He will return to the same work in the Caroline Islands, where he hopes there will be many more school books to print. He is most interested in the machining side of the work.

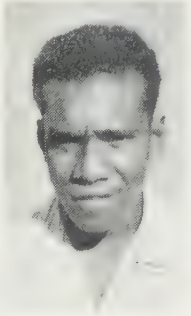
KOJRAK CALEB, 30, of Jaluit, Marshall Islands, also studied printing for one year in the Department of Education, Majuro. He learnt letterpress at the Government Printing Office, Suva, and now is rounding off his knowledge with offset experience. On completion of the SPC Course he will return to his former work, in which the production of school books has high priority. He is particularly interested in the machining and plate-making side of the work.

WESTERN SAMOA

LIU IOSEFA, 23, of Apia, Western Samoa, worked in the London Missionary Society Printery in Western Samoa, where the usual tasks were the printing (by letterpress) of a vernacular news-sheet, hymn books, school books and the Gospel. Liu will return to this Printery and assist in the installation and operation of offset machinery. His chief interest is in copy preparation.

FAGAMANU PEMERIKA, 22, of Apia, Western Samoa, came straight from school (Leulumoega Fou), where he was in Form V. After the SPC Course finishes, he will work in the London Missionary Society Printery at Malua, Western Samoa. His chief interest is in the machining side of the work, but he is anxious to see more school books printed, both in Samoan and English.

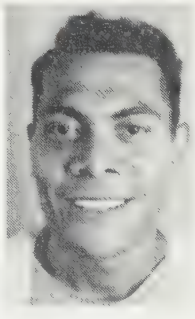
Jon Koniel



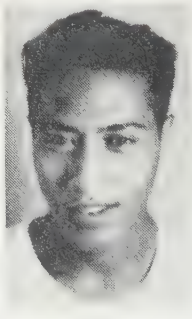
Patrick Paulisbo

Theodore Sigrah

Kojrak Caleb



Liu Iosefa



Fagamanu Pemerika

accurate collating in triplicate of several thousand numbered pages is a valuable exercise in maintaining mental alertness through a long and repetitious job. Not only that, but the final evidence of the book, with its exactly matching duplicates and triplicates, shows the accuracy of all the preceding stages of paper-cutting, printing, handling and stapling.

Wide Range Of Books Produced

Literature production is our ultimate aim, but this entails a fair amount of staff work in which the trainees so far have not been able to give very much assistance. Editorial work, layout, and copy-typing require a rather higher level of education—or ability to apply it—than some of the trainees possess. Yet we have already achieved something.

Our first publication was *Mosquitoes And Malaria*, a booklet of 12 pages for the Education Department, containing three lessons for World Health Day 1960. This was varityped on to direct-image plates, and illustrated after the typing by sketches done with reproducing pencil. Direct-image plates (which are the cheapest) were chosen as only 400 copies were required, and if a reprint is called for at any time (with amendments if necessary) these pages can be simply photographed on to pre-sensitized plates.

Another book for the Education Department, *Journey Through The Ground*, was our first attempt at printing coloured illustrations. This is a book of 26 pages, containing eight Solomon Islands stories for supplementary reading in the schools. An edition of 2,000 was printed from pre-sensitized plates, which are now stored and can be used again at a moment's notice when a reprint is required. The illustrations, done by trainee Tearoroa Ariki from the Cook Islands, are in black, red and green, with brown as an additional colour from overprinting the red and green.

The colours in *Journey Through The Ground* are a little out of register; at the time we did not have the best tracing paper, and the artist had still to learn the limits of tolerance of the tracings. There is another slight blemish—half a word is missing from the end of one line of the text. Examination of the original copy and of the photographic negative shows no fault; the omission occurs in the printing plate. We deduce that a small piece of masking paper must have covered the letters in question on the negative when it was printed down on to the plate.

On the whole, however, we feel that this book was a successful production, especially as the cost of materials worked out at only 5d. a copy.

We were glad to have the opportunity of printing two books prepared by our parent body, the Commission's Literature Bureau. These books were *Things To Do In Women's Clubs*, Book I, for the territory of Papua and New Guinea, and *Our Pacific*, Book I, for the Literature Bureau. For both of these books the copy was already prepared for us, and our task was just to photograph it, make the plates and print the books. However, as these are books of 40 and 72 pages respectively, and *Our Pacific* contains numerous half-tone illustrations, they provided very valuable experience.

Other books which we have produced are *A Short History Of The Solomon Islands*, for the Education Department, and *Conditions And Cost Of Living In The Protectorate*, for the Protectorate Government. Both contain a map printed from a plate we made, but otherwise were printed from typed direct-image plates. Another book, made in the same way, and also of about 20 pages, is Dr. Capell's *Foundation Vocabularies*, containing work lists and specimen sentences for linguistic studies. Five hundred books were printed of each title—a number that would have been rather expensive in letterpress.

Annual Reports for the Forestry Department, the Ports Authority and the Trading Corporation have been printed in a much more presentable form than cyclostyled sheets would have provided, though the number of copies in each case would hardly have justified normal printing.

Leni And Pola Books

The Centre has published a series of four little books written by the Editorial Officer in a vocabulary of about 400 words and keeping within the sentence construction and grammar of Book II of the Oxford English Course for Papua and New Guinea. They are intended for supplementary reading at the end of second-year English or at the beginning of third year. The titles are *Leni Goes Hunting*, *Pola And The Crocodile*, *Leni Visits His Grandmother* and *Pola And The Sick Baby*.

Costs were kept to a minimum, and were adequately covered on the first impression of 1,000 of each title by selling the 8-page booklet at 2d. a copy. Further reprints, using the same metal plates, will provide a little profit to finance other publications. The first impression has already been completely sold to government and mission schools in Papua and New Guinea and the Solomon Islands, and a second impression of 1,500 has been printed.

Each page of the booklets has an illustration drawn by our artist-trainee Tearoroa Ariki, and each booklet is printed in a distinctive colour—black, green, brown, or blue. Four pages of pen-and-ink drawings and the varityped text were pasted up on to one sheet, photographed and printed down on to one pre-sensitized plate. Thus each book, consisting of a cover and eight pages, was printed from three plates.

Appreciation of this series has been expressed in the territories, and a suggestion made to add further titles. Dr. Capell has kindly supplied a translation of the text of two of the books in the Baniata language of the Western Solomons with a view to publishing a bilingual edition, with English on one page and the vernacular on the opposite. This can be done quite readily, and at little extra cost.

Letterpress Operations

Although the Centre is a litho-offset printery, we have a small treadle-operated letterpress for such work as printing covers. This piece of equipment has more than justified itself, and has proved very popular for printing certificates, registration cards, compliments slips, letterheads, etc., as well as titles. It has been used in 50 jobs, sometimes using direct print, sometimes printing on to an offset plate which is then used for the further printing of some hundreds of copies, and sometimes for printing titles which are then photographed on to a pre-sensitized plate for offset printing. The fine, sharp print of the letterpress types is very attractive, and when there are only a few words to be set up it is well worth the longer time taken.

The time factor, however, is made very apparent by the back-log of work waiting for the letterpress. Although it might take a trainee two or three hours to type one foolscap page for printing, on the letterpress a whole morning can be taken to set up five short lines of type.

Smart letterheads have become popular in Honiara since the LPTC showed how easily they can be done. Mr. Koenen has designed and printed ten of them, ranging from a plain title and address to letterheads in three colours and with a picture. Plates for these are of course made with the process camera.

Two Posters Produced

Two posters have been made—one for the WHO Yaws Campaign, and one for the Boy Scouts. The former, which filled our maximum printing area of 13″ x 9½″, was printed in two colours, and included a half-tone reproduction taken from an illustration in a book. This posed some technical problems and required considerable experimenting, but was very successful in the end.

The poster for the Boy Scouts was a badge printed in three colours for sticking on the windshields of cars. This was not easily done, as the drawings had fine details of geometrical curves and lettering which required exact register in printing from the successive plates.

If we had another artist among the trainees we would look for more work of this sort. As it is, there is more than enough work for our one artist.

Work In Hand

Several supplementary readers and a health education book for Solomon

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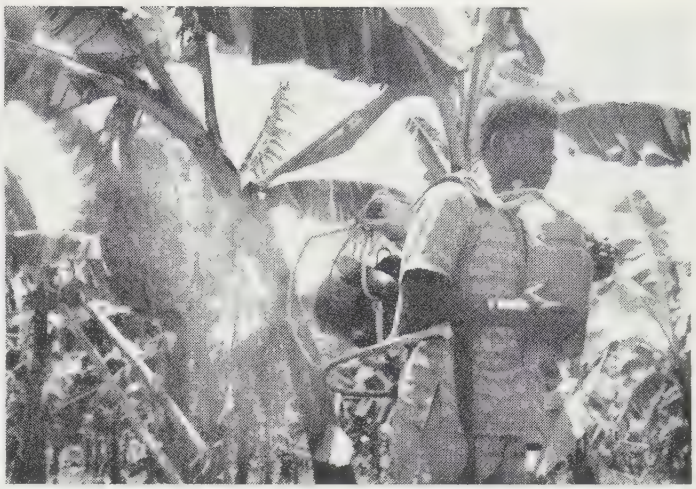


Above: Bananas damaged by scab moth, a common pest in the Pacific. Right: Applying insecticide to a banana crop with a portable mist blower.

Protecting Crops Against Insect Pests

In the Pacific, as elsewhere, insects which attack crops are an ever-present problem. Modern ways of controlling them—by cultural, chemical, and biological methods — are described in this article.

By B. A. O'CONNOR*

IN all parts of the world, insect pests represent a formidable challenge which must be met. The South Pacific area is no exception, and insect pests of crops regularly take a heavy toll. Hence it behoves the grower to acquire a basic knowledge of methods used in controlling these pests, which he can apply to his particular problems. In this article an attempt is made to describe the main techniques involved.

Cultural Measures

A vigorously-growing plant is better able to survive attack by insects than a sickly one, so that good agricultural methods are important. These include choice of suitable soil, proper cultivation and drainage, adequate fertilizing and so on, and need not be dealt with in detail here.

There are, however, other cultural measures which have a more direct effect in modifying attack by insects. Some of these are:

SELECTION OF CLEAN PLANTING MATERIAL: If planting material is infested by insects before it is placed in the soil, the crop is handicapped from the beginning. This often happens, as for instance in crops of bananas and sweet potatoes, where planting material is infested with banana weevil borer and sweet potato weevil, respectively. Every effort should be made to obtain planting material from crops which are free from pests and diseases. If this cannot be done, the material should be treated so as to destroy insect infestation. Depending on the pest involved, this may call for fumigation, dipping in insecticidal fluids, treatment of the soil or inspection and culling of the material.

ROTATION OF CROPS: This is good agricultural practice, and can be an important factor in controlling a wide variety of pests, particularly those which dwell in the soil or attack the underground portion of a crop. Pests will build up in a succession of plantings of the same crop, but their numbers will be greatly reduced by including in the rotation crops on which the pest in question cannot breed. Maize and sweet potato are instances of crops which may suffer very severely if successive plantings are made.

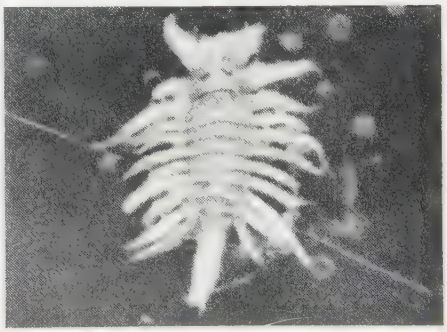
USE OF RESISTANT VARIETIES: This method is widely practised throughout the world, but is perhaps of more importance for plant disease control. However, sweet potato varieties vary greatly in their resistance to weevil attack, and the same is true of banana varieties and their resistance to Bunchy Top (a disease transmitted by an insect). As agricultural science develops in the South Pacific area, there will no doubt be more scope for the use of this technique.

DESTRUCTION OF CROP RESIDUES: When a crop has been infested by an insect pest, the remains of the crop after harvest will often carry over the infestation. Instances of this may be found in the corn borer and the sweet potato weevil. Thus it is good practice to destroy crop residues by burning.

Use Of Insecticides

The development of potent synthetic insecticides during and since the second World War has revolutionized this very important method of insect control, and —though the emergence of resistant strains of insects has introduced compli-

* Senior Entomologist, Department of Agriculture, Fiji.



Right: Parasitic wasp Chelonus striatagena, ovipositing in eggs of banana scab moth. Extreme right: Larva of the ladybird beetle, Cryptognatha nodiceps, feeding on scale insects.

Left: A knapsack sprayer in use. Above: Applying insecticide in the form of powder with a rotary dusting machine.

cations—the intelligent use of insecticides is indispensable in controlling the majority of insect pests.

Twenty years ago insecticides were classified in two groups, namely, contact insecticides and internal poisons. Contact insecticides were used to control sucking insects, and stomach poisons to control chewing insects. The contact insecticides had little residual effect, so that it was necessary when spraying to hit each individual insect with the spray fluid, in order to obtain a high mortality.

Most modern insecticides in common use kill by both contact and ingestion, and have some degree of persistence. Hence many sucking insects, as well as chewing ones, can be killed by a spray which is not specifically directed against the bodies of individual insects. Now only some sedentary insects need to be directly hit by the spray, others being susceptible to systemic insecticides, which they ingest with the sap of the plant.

Today there is available such a bewildering array of insecticides that it is sometimes difficult to decide which is the best to use. In the South Pacific area, where there is a dearth of people skilled in the handling of insecticides, and where the wearing of protective clothing would be hardly tolerable because of the warm and humid climate, insecticides which are highly toxic to man should be avoided.

Among the more common organic phosphorus compounds, Parathion is dangerous, Malathion is very safe, and Diazinon quite reasonably safe.

Of the systemic insecticides (those which are absorbed into the tissue of the plant) many are highly toxic to man, while others, such as Rogor and Metasystox, can be safely used with reasonable care. Among the chlorinated hydrocarbons, BHC and Lindane, DDT, Chlordane, Aldrin and Dieldrin are all safe if used with reasonable care, but Endrin and Isodrin are more dangerous. Some of the carbamates are highly toxic, but Sevin, for instance, is quite safe.

It is, of course, necessary to handle insecticides with care. Contact with and inhalation of sprays and dusts should be avoided as far as is possible, and one should wash thoroughly after using them.

A little forethought will help in minimising contamination. For instance, if there is any wind, it is wise to begin treating a field from the leeward side, so that drifting spray fluid or dust will be blown back on to the rows already treated. In this way the operator keeps moving into the uncontaminated area.

The choice of a suitable insecticide for control of a specific insect pest can be made on advice from staff members of Agricultural Departments and from representatives of firms which deal in insecticides.

Most modern insecticides are effective against chewing insects, and also against many sucking insects. Some are specifically good against certain pests, as for example Dieldrin and Chlordane for ants (which often foster mealybugs, scale insects and aphids) and for soil-inhabiting insects. Organic phosphorus insecticides control a wide range of aphids, mealybugs, scale insects, mites and leaf-mining insects.

Systemic insecticides are especially valuable against aphids, which are difficult to control by using contact sprays. Systemics have the advantage of killing the pest without affecting predators such as ladybird beetles, and they also have considerable residual effect, which protects leaves which unfold after the time of application.

There are various methods of applying insecticides. In the South Pacific area small applicators such as knapsack sprayers, rotary dusters and small mist-blowers are normally used. Tall crops such as coconuts call for treatment by aircraft or large dusting machines.

Application of insecticides in the form of a spray has the advantages of lower cost of materials and greater resistance to being washed off by rain. Dusting is quicker and less laborious than spraying. Mist-blowing combines the advantages of both sprays and dusts, but the capital outlay is greater.

No matter what equipment is used, thoroughness of application is necessary. Investigation of complaints by farmers that an insecticide is ineffective often show that application has been poor and a totally inadequate quantity of insecticide has been applied.

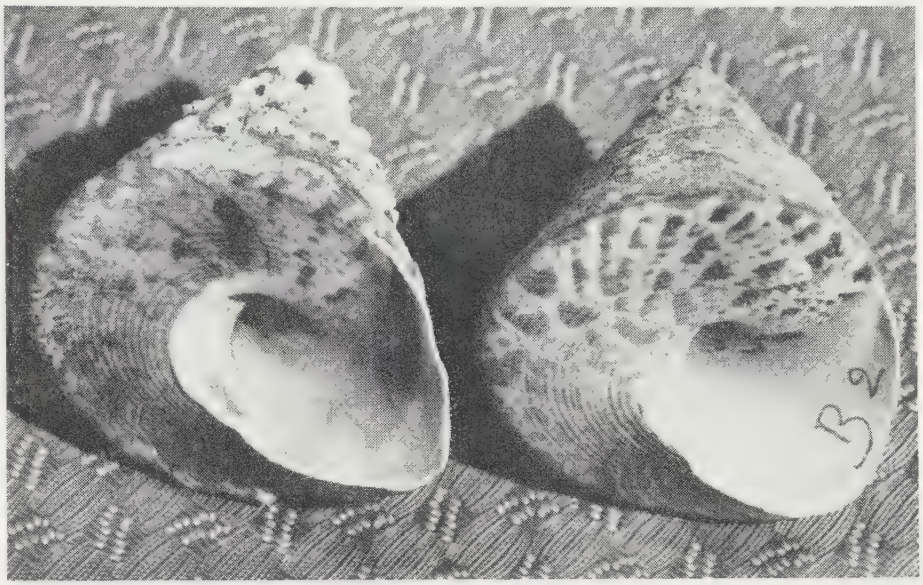
Baits and traps should be mentioned in passing, though they do not at present have wide application in the South Pacific area. Baits may be used for pests such as armyworms, and overseas there has been considerable use of chemically-baited traps, light-traps and sticky bands. Pests such as the rhinoceros beetle and palm weevils would appear to be likely subjects for trapping, and the South Pacific Commission is carrying out research into chemical attractants for the rhinoceros beetle. It is possible also that

(continued on page 71)

1957 Trochus Transfer To Cooks Apparently Successful

Early in 1957, acting on the advice of the Commission's fisheries officer, the Cook Islands Administration arranged for two transfers of live trochus by air from Fiji to Aitutaki Island. Now, with the arrival at Commission headquarters from the Cook Islands of a young trochus shell comes probable proof that the original stock is in fact breeding.

By LOUIS DEVAMBEZ*



Young trochus from Aitutaki (left) alongside trochus of similar size from New Caledonia (French Institute of Oceania collection). The spiral ridges on the base are much smoother in the latter, which also does not have the row of tubercles growing along the whorls of the former.

MR. RONALD POWELL, Fisheries Officer of the Cook Islands, has recently obtained from Aitutaki a 2½" trochus shell of rather unusual appearance.

This shell was sent to the South Pacific Commission, where the Fisheries Officer, Mr. H. van Pel, expressed the opinion that it was most probably a young *Trochus niloticus*, although some juvenile characteristics were present which usually disappear in trochus of that size.

The specimen sent by Mr. Powell shows a well-defined series of tubercles along the suture of the whorls, a trait which usually disappears in the young trochus shell before it reaches 1½" in diameter. Another characteristic of young trochus present in this shell is a series of spiral ridges on the base, faint but easily discernible to the touch. These ridges are quite visible in trochus up to 1" in diameter, but usually disappear as the shell grows bigger.

Finally, as was pointed out by M. Michel Angot, of the French Institute of Oceania, Nouméa, the width of the whorls is noticeably greater than in specimens of comparable size collected in New Caledonia.

All this points to an extremely rapid growth, which may raise problems in connection with the determination of size at maturity, the establishment of a rational minimum size limit, etc.

One Of First Trochus Born In Cooks?

While these points are very intriguing from the biologist's point of view, the fact that this shell is probably a representative of the first generation of trochus born in the Cook Islands may be of more widespread interest.

The transplantation of trochus from Fiji to the Cook Islands took place early in 1957. Later reports stated that the rate of survival was good, that the trochus had progressed towards the edge

(continued on page 36)

The small trochus in this photograph was collected, together with the three large specimens, on Aitutaki reef in March last. The hopes it then raised that the original trochus had begun breeding were largely confirmed when the specimen discovered the following month (pictured at left in top photograph) was sent to Commission headquarters for examination.

* Assistant Fisheries Officer, South Pacific Commission.

A display booth featuring the work of the Barbados Development Board.

Promoting Economic Development In Barbados

A Small Caribbean Territory Sets Out To Broaden Its Economy

By V. D. STACE*

INTRODUCTORY NOTE

At the twentieth session of the South Pacific Commission held in October 1959, the Commissioners gave detailed consideration to some of the social and economic difficulties of Pacific territories that are closely associated with population growth, and the urbanization trends now developing in the region. An Urbanization Advisory Committee has been established and basic documentation is being assembled in preparation for a special meeting of this Committee early in 1961.

In various projects the South Pacific Commission has recognized the continuing need for the promotion of trade and industry in the area, and has informed member governments recently that Commission facilities are available for the holding of meetings on problems concerned with trade and economic relationships and questions such as communications and tourism.

In recognition of the need for promoting secondary industries in the South Pacific territories, the Commission has offered to assist any territorial administration that may so desire, in the publication of GUIDES TO INVESTORS *and to assist inter-territorial study visits for the purpose of studying the establishment of specific industries.—V.D.S.*

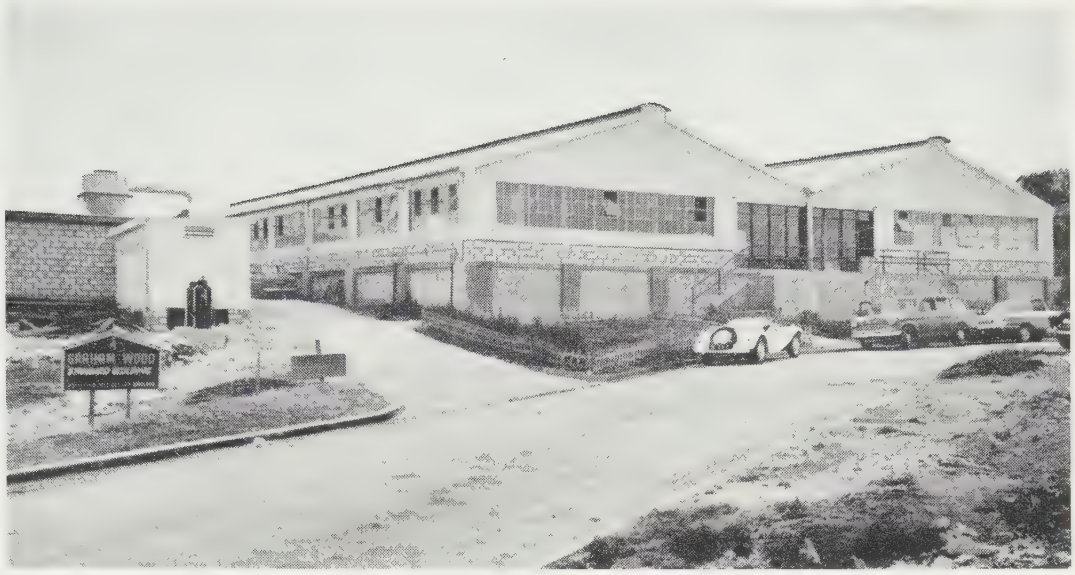
BARBADOS, a small British Colony in the Caribbean area, is constructively and optimistically approaching the task of stimulating local industry and developing its tourist trade in a special effort to provide employment for its rapidly growing population. The Colony is now facing employment problems of a kind that will become increasingly general in the South Pacific region, more especially in the Polynesian areas, as very rapid rates of population growth press heavily on the limited economic resources of the territories concerned.

The following brief survey of the current economic situation of Barbados will emphasise to Pacific Islands readers how closely the pattern of development in several South Pacific territories conforms to the essential features described. For this reason the special development measures now being taken in this Caribbean Crown Colony are of special interest to people of the South Pacific, who now see a growing need for employment promotion policies in several territories already showing ominous signs of quite widespread underemployment and some localized unemployment.

Current Economic Situation In Barbados

Barbados is a small island of 166 square miles in area, with a fairly high proportion of fertile soils, most of which

* Mr. V. D. Stace is a leading New Zealand economist who at present is engaged in making a regional survey for the South Pacific Commission of the methods that are being used, or could be adopted in Pacific territories, to promote capital formation and provide credit for development in village and urban communities. Mr. Stace was given leave of absence for this purpose by the Reserve Bank of New Zealand.—Editor.



The first factory established by the Barbados Development Board at its Industrial Estate, where land and factories are available for renting or purchasing on favourable terms.

are now in continuous cultivation producing sugarcane. Average productivity of cane per acre and sugar per ton of cane are both above the standards in other islands in the Caribbean. Soils not now producing sugarcane are considered marginal, but the restrictive nature of international sugar controls, rather than the environmental conditions of Barbados, now impose limitations which preclude further expansion of the Colony's mono-crop which, for example, earned $43.6 million in 1957 from exports of sugar, molasses and rum, of a total export income in that year of $49.7 million.

The population of Barbados is increasing rapidly, growing from 198,000 in 1946 to 230,000 in 1958, notwithstanding some emigration which is officially encouraged. It is estimated that 20,000 of the Colony's 40,000 total adult male wage earners are agricultural workers. In full-time employment only during the harvesting of the cane crop, some 14,000 members of this labour force secure only part-time employment for the remainder of the year. With a population density already at the high level of 1,400 people to the square mile and a prospective average rate of population growth of about 2 per cent. per annum facing the Colony, an effort is being made now to find employment for 10,000 additional workers by 1965, when the island's total population will exceed 260,000.

The building of this new hotel overlooking the sea was financed by the Barbados Development Board.

Experience has shown in Barbados that its tourist industry could be developed to a stage where income earnings from this source would equal those derived from its sugar industry. There has been an impressive growth in the number and quality of tourist hotels in the Colony in recent years. The total number of tourists arriving increased from 17,800 in 1956 to almost 25,000 in 1958.

Secondary industries are at present relatively small employers of local labour. Sugar, molasses and rum are manufactured and exported, and some locally manufactured edible fats and soaps are also sold abroad. Protection against overseas competition is given to the small clothing industry in Barbados, but at present only one local factory has shown the capacity to reach satisfactory standards of efficiency. Other locally-manufactured products for internal use are confectionery, biscuits, mineral waters, macaroni, frozen fish, ice manufacture and cold storage, clay and concrete building materials, furniture, boat-building and handicrafts. There is also a small shoe factory. The local sea-fishing industry is of growing importance.

A large section of the community finds employment in service industries, including those closely associated with the tourist trade. The Colony has one of the highest percentages of domestic workers in the Caribbean.

Lacking local forestry resources, all timber and fuel woods must be imported. The Colony is also heavily dependent on imports of foodstuffs including rice, flour, salted pork, milk, etc., which are basic elements in the local food supply. With the exception of limestone, clay and some natural gas, Barbados has a

paucity of raw materials for its industrial development and housing needs. Its principal economic resources, apart from farming lands which are in limited supply, are the Colony's surplus supply of unskilled labour, its well-developed roads and external communications, its fisheries, its favourable climatic conditions and easily accessible beaches.

Public amenities and social services within the Colony are well developed, and the Colony claims a literacy rate in excess of 97 per cent. of total population. Emphasis is now being given to technical education to provide a higher proportion of skilled craftsmen for the island's industries.

Development Board And Other Promotional Activities

The following section briefly summarizes some of the principal activities now being undertaken to broaden the economy of the Colony. Although dependence of the mono-crop sugarcane has brought severe problems in past years of unfavourable prices, Barbados has a proud record of financial independence as far as overseas loans and grants-in-aid are concerned. The only external debt at present is a recent loan raised in London for the equivalent of $12 million (West Indian currency). Internal loans of about $4 million per year have been raised recently to help finance an active public works programme.

The external borrowing mentioned above is being used to finance a major project, the construction of a deepwater harbour at the principal port, Bridgetown, which is due to be completed in August, 1961. Seawell airport, 11 miles from Bridgetown, has been extended to accommodate the prop jet aircraft now providing international services in the Caribbean area.

Barbados Development Board

After some years of preliminary activity, the Barbados Development Board was established in 1957 as a Statutory Corporation for the specific purpose of stimulating the expansion of local industries, the development of new industries and the encouragement of investment from overseas sources.

The Development Board, which is controlled by a Board of Directors appointed for their experienced knowledge of business and local affairs, acts as an independent authority. Provided with funds totalling $1,500,000 during the period 1957/60 by the Barbados Government, the Board operates with the assurance that further finance will be made available under the 1960/65 Development Plan for Barbados, while authority exists also for the Board to borrow funds from other sources.

The Board has power to lend or invest money in any soundly-conceived project which is of benefit to the island. Designed to promote economic development in those fields which do not lend themselves to Government enterprise, but are rather too hazardous initially for private investors to develop, such a Development Board has a special role to perform in an under-developed territory. Through an association of Government and private investment funds, enterprises with sound long-term commercial prospects may be established where, for instance, the possibility for early profit earning is remote. In Barbados the Development Board welcomes collaboration with private enterprise, and loans to expand business undertakings or develop new enterprises have been made to various types of industry, ranging from fish processing to printing and from shoe manufacture to the establishment of new hotels. The Board operates an Industrial Trading Estate where land and fabricated factories will be available for renting or purchasing on favourable terms. Advice on development problems is given freely and without obligation, while the Government education services are ready to co-operate with new enterprises in providing trade training schemes at the local Technical College.

Incentive Legislation

In accordance with its policy of providing an economic environment conducive to business and industrial expansion within the island, the Government of the Colony has enacted a comprehensive range of incentive legislation to attract the investor. The principal measures are as follows:

(i) The Pioneer Industries Act, 1958

Any pioneer industry of benefit to the island may obtain tax-free status for up to seven years, with various alternative tax arrangements for those industrialists who prefer to take advantage of the normal depreciation allowances at an earlier date. Constructional material, plant and machinery for equipping and operating the pioneer factory may be admitted duty free irrespective of their source of origin.

Dividends from investments in pioneer industries are tax-free in the hands of the recipient: likewise interest on loans to such an industry.

(ii) The Hotel Aids Act, 1956.

Any hotel proprietor may erect new guest accommodation or extend his existing accommodation and charge the capital cost against his trading profits, carrying forward the charge up to seven years or to such earlier date by which it could be set off against his taxable income. New amenities such as swimming pools, air-conditioning and sea walls may also be charged against taxable income.

Construction material, plant, machinery and a wide range of hotel fittings and equipment may be brought in duty free for approved developments, either for accommodation or amenities.

(iii) Duty-Free Importation of Raw Materials—Customs Act, 1910

The Trade Act, 1910, permits "manufacturing in bond" and duty-free importation of raw materials devoted wholly to the export trade. Any manufacturer who exports his output is normally granted drawback of any duty paid on imported materials incorporated in the exported goods.

(iv) Repatriation of Foreign Currency Investment Funds

The repatriation of foreign currency funds put into an approved investment is fully safeguarded. Any profits from such an investment can be converted into a required foreign currency. If the investment is sold, the proceeds, including any capital gain, can also be repatriated.

Fisheries And Fish Processing

Sea-fishing, for flying fish in particular, has been an important commercial activity in Barbados for many years. More recently special efforts have been made to extend the range of fishing and fish processing since, potentially, an efficiently - organized fishing industry could be one of the Colony's most valuable assets.

Nearby deep sea fishing grounds have been only lightly touched by commercial fishermen from Barbados who have lacked capital in the past and adequate marketing outlets. At present assisted by a Fishing Boat Subsidy Scheme and the provision of processing plants at all important fishing beaches, the local market has been expanded significantly.

Although predominantly in the hands of private enterprise, the island's fishing industry is being assisted financially and socially by the erection in Bridgetown of a central Government cold store and fish processing plant to utilise periodic surpluses that arise and are substantially in excess of the normal demand for fresh fish. In these ways operating hazards have been reduced and the market successfully expanded, while earnings and prices have been kept at levels that are satisfactory to the fishermen and the consumer.

Encouraging Indications

An indication of the success which has been achieved by the granting of additional incentives and by stimulation and development programmes is well illustrated by the increase in hotel bed accommodation, which rose from 1,147 beds in 1958 to 1,413 in 1959. The number of stay-over tourists for the same two years increased from 24,945 to 30,249. Most encouraging of all is the steady rise in the *per capita* income, which in 1959 stood at $466 per head.

Barbados faces the future determined that all possible will be done to find employment for its growing population, and to bring prosperity to the West Indies Federation.

Participants and observers who attended the eleventh meeting of the Commission's expert advisory body, the Research Council, photographed outside Commission headquarters in Noumea. Front row (l. to r.): Dr. G. Hoekstra, Dr. L. H. Winter, Dr. Arthur S. Osborne, Dr. H. Turbott (Chairman), Mr. T. R. Smith (Secretary-General), Professeur Agrege H. Gounelle, Sir Selwyn Selwyn-Clarke, Dr. T. K. Abbott. Back row (l. to r.): Dr. Richard Seddon, Dr. Emile Massal, Dr. Jacques Barrau, Dr. L. O. Roberts, Dr. P. W. Dill-Russell, Dr. F. Schofield. Sir Selwyn Selwyn-Clarke and Professor Gounelle attended the meeting as specialist consultants.

SPC Research Council Holds Eleventh Meeting

By T. K. ABBOTT*

THE eleventh meeting of the Research Council of the South Pacific Commission was held at Commission headquarters in Nouméa from July 12 to 28 last. Dr. H. B. Turbott, Director-General of the Department of Public Health, New Zealand, was elected Chairman.

Two consultants from Europe attended, and gave valuable advice and assistance. Professeur Agrégé H. Gounelle, of the Centre de Recherches Foch, Centre de Recherches Cliniques et Biologiques sur la Nutrition de l'Homme, Paris, visited Nouméa some weeks before the Council meeting and studied all the documentation on nutrition in the possession of the Commission with a view to offering advice on future policy which the latter should pursue in this subject.

Sir Selwyn Selwyn-Clarke, Medical Secretary to the Society of Medical Officers of Health in London, also brought to the meeting a wide knowledge and experience of public health in the tropics, and the Council greatly benefited from his observations on the various items considered.

Dr. L. O. Roberts, Area Representative of the Western Pacific Regional Office of WHO, attended as an observer.

Dr. A. S. Osborne, Chief, International Organization Relations Branch, Division of International Health, Department of Health Education and Welfare, Washington, attended as an adviser.

The Council considered the whole range of subjects in which the Health Section of the Commission interests itself, and gave its opinion on the general policy which it considers the Commission might pursue in the future. Topics discussed included nutrition and diet, a pro-

* Executive Officer for Health, South Pacific Commission.

ELEVENTH RESEARCH COUNCIL MEETING: Participants And Observers

Members

Dr. P. W. DILL-RUSSELL: Director of Medical Services, Suva, Fiji, and also Inspector-General of the South Pacific Health Service.

Dr. G. HOEKSTRA: Director of Health, Department of Health, Hollandia, Netherlands New Guinea.

Docteur E. MASSAL: Directeur, Institut de Recherches Medicales de la Polynesie Francaise, Papeete, Tahiti.

Dr. F. SCHOFIELD: Assistant Director (Medical Research), Department of Public Health, Port Moresby, Papua and New Guinea. (Alternate for Dr. R. Scragg.)

Dr. H. TURBOTT: Director-General, Department of Health, Wellington, New Zealand.

Dr. L. H. WINTER: Director of Medical Services, Department of Medical Services, Pago Pago, American Samoa.

South Pacific Commission Officers:

Mr. T. R. SMITH: Secretary-General and Deputy Chairman Research Council.

Dr. T. K. ABBOTT: Executive Officer for Health.

Dr. Richard SEDDON: Executive Officer for Social Development.

Dr. Jacques BARRAU: Executive Officer for Economic Development.

Consultants

Sir Selwyn SELWYN-CLARKE, K.B.E., C.M.G., Secretary of the Society of Medical Officers of Health, London, England.

Professeur Agrege H. GOUNELLE, President, Centre de Recherches Foch, Centre de Recherches Cliniques et Biologiques sur la Nutrition de l'Homme, Paris.

Advisers

Dr. Arthur S. OSBORNE, International Health Representative, Public Health Service, Department of Health, Education, and Welfare, Washington.

Medecin-Colonel L. CAILLARD, Directeur du Service de Sante de la Nouvelle-Caledonie et Dependances, Noumea.

Observer

Dr. L. O. ROBERTS: WHO Area Representative, Sydney, Australia.

Personalities attending the meeting included: (l. to r.) Dr. Hoekstra from Netherlands New Guinea, here shown chatting over a cup of tea with Sir Selwyn Selwyn-Clarke from the United Kingdom; Dr. Abbott, the Commission's executive officer for health, enjoying a lighter moment with Professor Gounelle of Paris. Seated is Dr. Dill-Russell from Fiji, while on the extreme right, Professor Gounelle, watched by SPC public health officer Dr. Norman-Taylor, looks for signs of malnutrition in a young indigene girl during a brief visit to Yate Village, on the east coast of New Caledonia.

posed SPC health information service, health education, mosquito-borne diseases, public health, epidemiological surveys, tuberculosis, environmental sanitation, and Commission collaboration with national and international bodies.

Cook Islands Co-operative Officers Studying In England

Mr. David Murray of Dunedin, New Zealand, who has been assistant registrar of Cook Islands Co-operatives on Rarotonga for the last four years, flew to England in September to take a six months' course at Oxford University.

Subjects he is studying include the practice and methods of marketing, the economics of co-operatives, capital investment, and—equally important in the development of the co-operative movement in the Cook Islands—community development and adult education. At Oxford he will also be able to exchange ideas and discuss problems with men who have worked in his field in many parts of the world.

Another member of the Department of Co-operation on Rarotonga, Mr. Apenera Short, left the Cook Islands in July to attend a co-operative seminar in Copenhagen organized by the International Labour Organization, and later to visit the ILO headquarters in Geneva. He is now in England attending a six-months' co-operative course at Loughborough, Manchester, similar to that being taken by Mr. Murray.

Drift Net Experiments In The Cook Islands

A series of experiments with drift nets (floating gillnets) was carried out recently by Fisheries Officer Ronald Powell of the Cook Islands and his assistant, Ioapa Marsters. Two nets made of nylon were used—one multi-filament and the other monofilament—each being 600 feet long and 12 feet deep.

The main purpose of the trials was to obtain a supply of bait fish for other experiments, and two species were mainly sought—ature (big-eyed scad) and mararo (flying fish).

According to Mr. Powell, the results were encouraging. He found that catches made with the gillnets were always better than the catch rate by boats using dipnets and lights.

New Technical Institute For Fiji

Full-time courses in technical and commercial subjects for about 170 boys and girls, and part-time day and evening courses for about 500, will be provided by a new technical institute to be built in Suva. It will include laboratories, classrooms, a workshop block, an administration block and a canteen.

The total cost will be £169,000, of which Britain's Colonial Development and Welfare Fund will contribute 90%, the balance coming from Colony funds. It is hoped that the buildings will be completed early in 1962.

A Midget Coconut Palm

Intrigued by the strange phenomenon of a coconut seedling flowering a few months after sprouting, Mr. E. Bégaud, of Olal, Ambryn Island, in the New Hebrides, has written to the Commission to enquire if such an abnormality had ever been noted before.

Mr. Bégaud describes his early flowering seedling as a sprouted nut bearing two narrow unopened leaves, and two small inflorescences bearing only female flowers.

According to the Commission's executive officer for economic development, Dr. Jacques Barrau, seedlings with this very early flowering habit, while fairly rare, have been observed in several coconut-growing countries, including India. Generally they die after a few months, further growth being impeded due to the fact that their inflorescences have developed from the terminal growing point.

New Youth Centres For Netherlands New Guinea

A donation of 80,000 guilders (£stg.7,522) made by Her Majesty Queen Juliana of the Netherlands to promote organized youth activities in Netherlands New Guinea will enable new youth centres for Papuans to be built in the territory. Leisure activities for Papuan youths that the centres will cater for will include lectures, films, courses, manual training, games and theatricals.

Clubhouses of attractive contemporary design measuring approximately 70′ by 33′ will be built, with a main room that will accommodate eighty people.

New headquarters will also be built for a number of regional Girl Guide and Boy Scout organizations.

Trochus Transfer To Cooks Apparently Successful

(continued from page 31)

of the reef and in some cases beyond the breakers, and that the shells were growing in size.

Since all the shells introduced by Mr. Powell and his assistant, Ioapa Marsters, were over 2″ in diameter in February 1957, the discovery in April 1960 of a live trochus 2½″ in diameter proved that the original stock was breeding. That fact, plus the observations regarding the probable rate of growth of this particular shell, do not provide much to work on. More specimens have been requested from the Cook Islands, and it still remains to be seen whether young trochus are comparatively abundant on the reefs of Aitutaki, whether they all show the same growth characteristics, or whether this one specimen was just a freak.

With all due caution it can be said that, on the strength of results obtained in Micronesia by Japanese biologists, the success of this trochus introduction is already fairly apparent, and complete proof of it can be expected in the near future.

While in the Solomons, Dr. Norman-Taylor gave several talks at a health education course for village teachers being conducted in Honiara by Miss Leonie Martin, SPC health education officer. Here, with two assistants, he demonstrates the building of a pit latrine.

Public Health Progress In Melanesia

Dr. W. Norman-Taylor, the Commission's public health officer, recently visited Papua and New Guinea, Netherlands New Guinea, and the British Solomon Islands to study public health problems at first hand and to discuss with the medical officers in charge, ways in which the Commission may be able to assist. His impressions are recorded below.

MALARIA, tuberculosis and hookworm infestation appeared to be the most outstanding public health problems facing the authorities of the three territories I visited. In the undeveloped parts it has been very difficult to deal effectively with these problems, but in areas where economic cash crops have been established, and where the growth of general education and the setting up of local councils has been possible, a welcome demand for basic rural health services is growing up. Following this it will be possible to tackle some of these more pressing public health problems in a more permanent manner.

In Papua and New Guinea, arrangements were made for me to visit the rural areas surrounding Goroka and Rabaul, where health care programmes of this sort are being developed. At Vunadadir near Rabaul in the Gazelle Peninsula area, there is an interesting experiment. It is planned to provide a general practitioner and preventive health service for the people.

A health centre has been built and a Papuan doctor is in charge. There is also an assistant health inspector and a midwife. The three work as a team, not only providing care for the sick, but, what is more important, going out among the villagers to try to improve the health conditions under which they live. The authorities hoped that this health centre, and the lessons to be learnt from it, will enable them to set the pattern of similar social-medical activities in other parts of the country.

Mother-and-child health nurses working with mothers in Netherlands New Guinea, where new methods of dealing with the great loss of life among mothers and babies are being pioneered.

Progress In Netherlands New Guinea

In Hollandia, they have an abundant and highly-experienced medical staff, and a good public health coverage is therefore being provided for the general public. In the administered areas medical officers make regular tours of every village, often travelling under the most difficult conditions, on foot or by canoe. They try to examine every individual person, particularly picking out the ones suffering from infectious diseases.

The health officials are confident that almost every case of leprosy and tuber-

Three trainee infant welfare nurses, and a local mother, preparing bottles and feeding babies. Papua and New Guinea.

culosis is known and under treatment. Similarly, there is an intensive drive to clear malaria, at least from the coastal areas. In one part, where the people are relatively inaccessible, anti-malarial drugs are being put in the salt, in the same way that iodine is put in the salt in Switzerland to prevent goitre. It will be interesting to follow the success of this method.

Netherlands New Guinea has been pioneering new methods of dealing with the great loss of life that occurs among mothers and babies. Young girls are trained in child welfare methods and visit the homes in the settled areas. In the less-accessible areas the Dutch health authorities are trying a novel method. They are calling in the traditional village midwives and giving them a short practical course in the elements of obstetrical hygiene. Already figures seem to show that lives are being saved.

Problems In The Solomons

At Honiara, I was able, thanks to the kind co-operation of the Chief Medical Officer, Dr. J. Macgregor, to study the existing social and economic background upon which the future public health service has to be built.

The great difficulty is that most of the population is sparsely scattered, communications are difficult and financial resources limited. These, together with the low level of overall education, make public health measures difficult to apply, and it is felt that little permanent progress can be made until these matters improve. In the meantime an attempt will be made, with the help of WHO, to reduce the toll of malaria, which, with its enervating effect on the population, is undoubtedly one of the chief factors hindering development.

The medical authorities have been greatly encouraged by the successful campaign against yaws undertaken by WHO. Previously yaws was a widespread, crippling disease, but it has, for the time being, almost completely disappeared. It is hoped that it will not be long before similar campaigns can be launched to deal with tuberculosis, leprosy and hookworm.

Health education is clearly also of fundamental importance here, and this is one of the fields in which the active assistance of the Commission is being given. Attention is also being paid to an improved training scheme for the medical assistants who work out in the villages, not only treating the sick but also endeavouring to improve the health and sanitary state of the people.

Long-term Prospects Encouraging

From the long-term point of view the outlook gives plenty of cause for optimism. In those areas where economic, social and educational levels have been satisfactorily achieved, a similarly satisfactory level of public health has been arrived at, too, and there is no reason why this should not apply to the whole of Melanesia in the near future.

In the meantime, as the Dutch have demonstrated in their part of New Guinea, the application of mass preventive measures, expensive in personnel and money though they may be, can at least hold the more serious threats to health at bay until the social situation improves sufficiently to ensure a permanent improvement.

American Game Fish For New Caledonia

(continued from page 25)

(for a predator at least), adaptability to high temperatures, and quick growth. Under conditions comparable with those existing in New Caledonia, they are known to reach a weight of twelve pounds.

Commission Assistance Requested

Once the choice of the fish was made, the assistance of the South Pacific Commission was requested, and the Office for the Development of Tourism in New Caledonia offered to cover part of the costs of introduction.

After the usual preliminary correspondence, which began early this year, firm arrangements were made with the Fish and Game Division, Department of Agriculture and Conservation of the State of Hawaii. Direct air communications with Honolulu were an important factor in the success of the introduction.

On July 26 last, nineteen black bass fingerlings arrived in New Caledonia. They were released the same day in a fish and game reserve which includes part of the Yaté Lake and the basins of two rivers flowing into it. They will find there some excellent spawning grounds, food and shelter, and it is hoped that they will stock the whole of the lake.

Further consignments will be obtained to strengthen this first introduction, and within the next few years Yaté Lake may well become a centre of attraction for amateur fishermen and tourists.

LPTC Trainees Make Steady Progress

(continued from page 28)

Islands teachers are waiting for editorial attention; and the need has been expressed for an atlas for Melanesian schools. There is a strong demand for these books, and the Editorial Officer is anxious to get to grips with them.

At the time of writing, the next book publication will be a "how-to-do-it" book on house-building for the Solomons. The text and illustrations have been supplied by the District Commissioner of the Central District, and the book will be titled *The Ysabel Building Unit,* from its island of origin.

Another good school book on which work is just commencing is a first Number work-book, designed by one of the Sisters of the Roman Catholic Mission in the Solomons. Originally intended for just the Sister's own school, the Centre has taken over the publication and will print a sufficient number to bring the price down to 1/6 a copy. There is a great need for this type of book, adapted to local surroundings, and we feel that the price is low enough for each child to have his own copy.

From this report it is hoped that the reader will gain a fair idea of the scope, variety and volume of the work being done by the Centre, of the realistic training afforded to the trainees, and of the contribution which such a literature production centre can make in a community.

By Jacques Barrau*

The Sandalwood Tree

Left: Leaves, flowers and fruit of the sandalwood tree. Below: Loading sandalwood at Erromango Island, in the New Hebrides. Last year the Condominium exported 65 tons, worth around £stg.6,500.

WHEN sandalwood was discovered in the islands of the South Seas at the beginning of the nineteenth century, European traders began to take a serious interest in the region. This much-prized, perfumed wood, which fetched very high prices on the Chinese market, had many uses, not the least being its burning as incense in temples.

India was at that time the principal producer of sandalwood. When it was learned that it also grew on various islands of the Pacific, scores of the trading captains — not always very scrupulous — who frequented those waters, rushed immediately in search of this precious wood. Thus the Pacific Islands entered a commercial era from which were to result important changes in the economic and social life of their inhabitants.

Among the useful plants of the Pacific, sandalwood trees probably suffered most from the greed of traders. For example, one day in the year 1804 the news reached Sydney that sandalwood had been found in the Fijian Archipelago. There followed a veritable scramble, and the subsequent ruthless exploitation of the sandalwood stands resulted in their almost total destruction. By 1816 Fijian sandalwood had disappeared from the markets.

The same thing happened in many other Pacific islands, and it was thus that one of the species, *Santalum fernandezianum* Phil., of the Juan Fernandez Islands became extinct.

In spite of this large-scale destruction, however, sandalwood is still obtained commercially in a few South Pacific islands.

A Botanical Note

Sandalwood is one of the small trees belonging to the Santalaceae family and to the genus *Santalum*. Species of this genus abound mostly in the Pacific region, but one among them, *Santalum album* L., also grows in India.

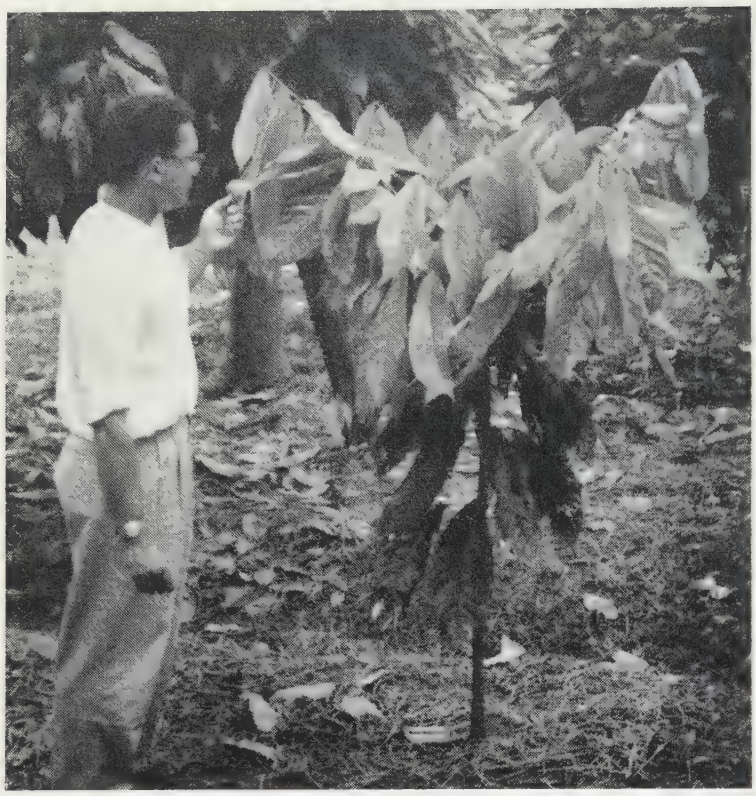
The area of the genus *Santalum* is between 30° N. and 40° S., from Indonesia in the west to the Juan Fernandez Islands in the east, and from the Hawaiian Archipelago in the north to New Zealand in the south. Australia, where grows, notably, the *Santalum lanceolatum* R. Br., can be included in this area.

Sandalwood trees are usually found in dry, "open" forests; dense forests appear unfavourable to their natural propagation. The trees are usually small, with entire leaves and small flowers whose calyx has four thick lobes. The flowers are often grouped in terminal panicles. The scars of the calyx lobes can be seen at the end of the fruit.

The species of the genus *Santalum* are semi-parasite. Like other plants they draw their food from the soil through their roots, but some have suckers and often feed on the roots of trees growing in the vicinity. However, their parasitism does not seem to be universal, as there are known cases of sandalwood trees growing in isolated conditions (as for example, *Santalum austro-caledonicum* Vieill., in New Caledonia).

(continued on page 63)

* Executive Officer for Economic Development, South Pacific Commission.



A seedling from a crossing—Lafi 7 (trinitario) X NA 32 (forastero), after 13 months. At left is Mr. C. Walker, officer in charge of Nadururloulou Station.

SPC Plant Introduction Activities Expand

The importance of plant introduction in the economic development of the Pacific islands, and the Commission's work in this field, were outlined in the BULLETIN *for January 1958*[1]. *Since then the Commission's plant introduction service has expanded steadily, the response from territories being most encouraging.*

By J. H. A. COENEN*

SINCE October 1958, 276 species and varieties of economic plants have been distributed within the South Pacific area by the Commission's Plant Introduction Service. Recipient territories included American Samoa, British Solomon Islands, New Hebrides, Cook Islands, Fiji, French Polynesia, Guam, Netherlands New Guinea, New Caledonia, Niue, Papua and New Guinea, United States Trust Territory of the Pacific Islands, Wallis and Futuna Islands, and Western Samoa.

Many Useful Plants Introduced

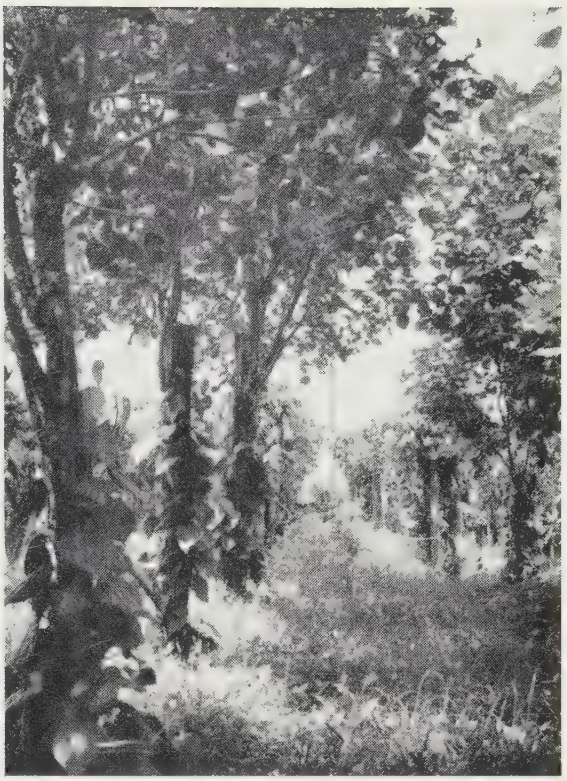
Plant material introduced and distributed to the above territories comprised the following: 3 varieties of *Coffea arabica,* 2 varieties of *Coffea canephora* or "Robusta" coffee, 8 varieties of cocoa, 2 coconut varieties, numerous rooted cuttings of black pepper, 7 species of bamboo, 5 upland rice varieties, 28 varieties of grain sorghum, 6 varieties of castor bean, several timber species such as *Araucaria cookii, Eucalyptus* spp., teak, mahogany, *Agathis* and *Terminalia* species, 10 varieties of peanuts, 9 varieties of pawpaw, 10 *Citrus* species, several taro and breadfruit varieties, one Ramie variety, fruit trees such as mango, rambutan, custard-apple and pomelo, several vegetables and

[1] *Plant Introduction And Exploration In The South Pacific,* by Jacques Barrau.

* Assistant Plant Introduction Officer, South Pacific Commission.

Below: Samoan-type cocoa drier at Nadururloulou. Right: A Tahitian breadfruit variety introduced to Nadururloulou in August 1958.

Above: A part of the black pepper collection at Naduruloulou.



Black pepper growing on Erythrina.

pulses adapted to tropical conditions, and 42 species and varieties of legumes and grasses useful as food plants, cover crops or as fodder.

It is most encouraging to see that more and more territories are interested in the Commission's plant introduction activities, and request its Plant Introduction Service to locate and obtain plant material.

Plant Exploration And Survey Of Economic Plants

The Commission's Plant Introduction Service is assembling information on all species and varieties of economic plants already present in the area. This is being done with a view to preparing a catalogue of them which will be circulated in the area to facilitate inter-territorial exchange of plant material.

Several publications have already been made on some of these plants by the former Plant Introduction Officer, Dr. Jacques Barrau (now Executive Officer for Economic Development).

In addition, the SPC Plant Introduction Service is circulating, from time to time, to the specialists concerned, inside or outside the Commission area, a Plant Introduction Newsletter in which information can be found on plant material available and the sources from where it may be obtained.

In the SPC plant collection and exploration survey, special attention is being paid to coconut palms and breadfruit tree varieties with a view to improving both crops.

This survey was initiated by Dr. J. Barrau. To further it, the Fiji Administration has recently seconded to the Commission, Mr. J. W. Parham, Botanist of its Department of Agriculture. New Guinea, the New Hebrides, and several islands in Polynesia are included in the area which will be covered by Mr. Parham in the scope of this survey.

Naduruloulou Plant Introduction And Quarantine Station

In its plant collection and introduction work the Commission has greatly benefited from the close and efficient collaboration of the Fiji Department of Agriculture, whose plant introduction and quarantine station at Naduruloulou has become an active introduction and propagation centre for the region. The work of this station has been assisted in recent years by an annual grant from the Commission (£stg.1000 for 1960).

The main part of the cultivated area at Naduruloulou is now devoted to a

(continued on page 43)

Right: Local selection S 1070, trinitario-type. Extreme right: Seedling of the crossing Lafi 7 X NA 32 flowering 13 months after planting, as compared with normal flowering after 2-3 years.

Village chief Aitai Karubaba and his crew—all expert in their traditional ways of fishing—put to sea in "Kemboong" for fishing grounds they could not reach before in their outrigger canoes.

Modern Craft For Papuan Fishermen

In Netherlands New Guinea, six 27-foot diesel-powered fishing vessels are being built at the Seafisheries Station at Hollandia. Papuan fishermen manning them will learn modern techniques that will enable them to take greatly increased catches from new fishing grounds they could not reach before by outrigger canoe.

By CLAUDE BELLONI*

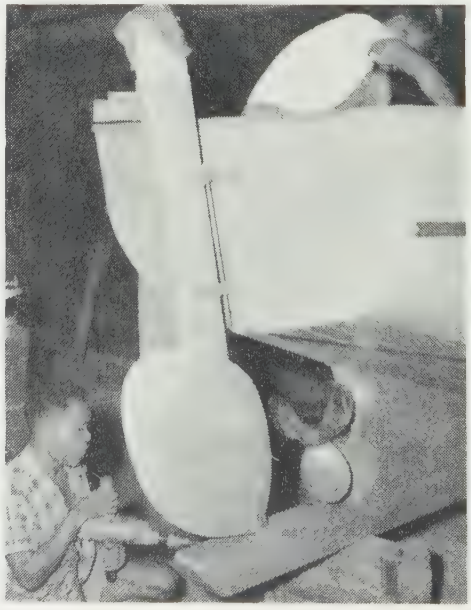
IN the grey dawn one morning last March the staccato chugging of a diesel engine disturbed the silence in picturesque Imby Bay, near Hollandia, Netherlands New Guinea. The sun had not yet appeared on the horizon, but behind Cape Suadja at the entrance to the little bay the sky was already rosy hued, with cumulus clouds drifting westward.

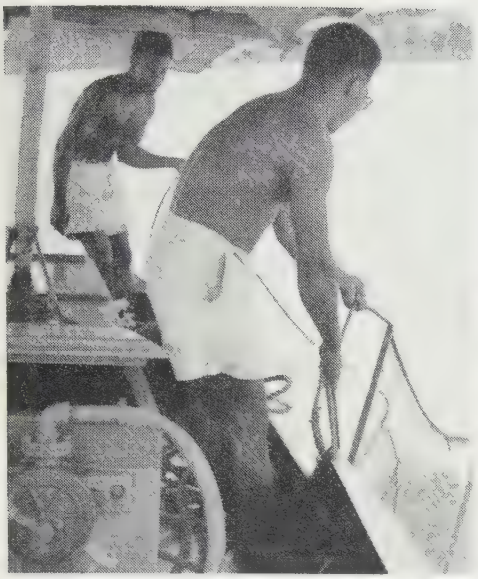
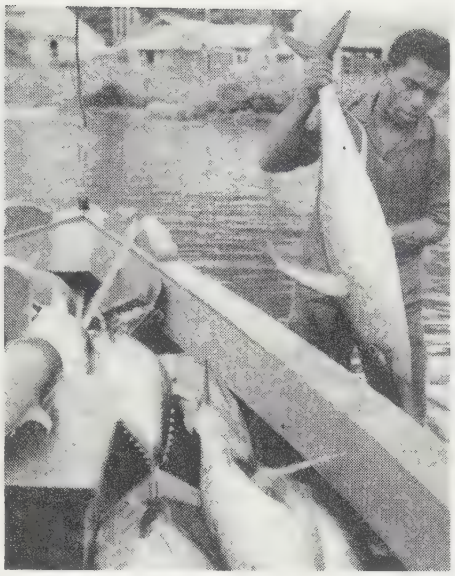
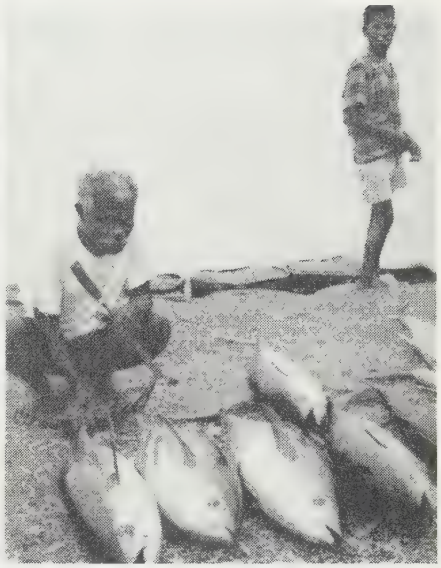
The chugging sound came from a small seabound fishing vessel, bearing her name KEMBOONG in black painted letters on her bow. (*Kemboong* is the Malay name for a delicious little fish.)

KEMBOONG, however, is not just an ordinary fishing vessel. She was built at the suggestion of the Dutch fisheries expert with the South Pacific Commission, Mr. H. van Pel, to introduce new fishing techniques and also to familiarise native fishermen with fishing boats better than their own outrigger canoes. With such craft they can fish in areas they were

* Public Relations Officer, Netherlands New Guinea.

These builders at work at the Seafisheries Station on the six new fishing vessels were all trained at the Lower Technical School, Hollandia.



Above: Paying out a net. Centre: Part of a catch taken by trolling. Right: Aitai Karubaba inspecting a catch to be sold at the native market on the Hollandia waterfront.

unable to reach with their canoes, and thus can extend their fishing grounds considerably. It also means greater catches at lower cost than is possible with outriggers powered by outboard motors.

Local Materials Used For Hull

KEMBOONG was designed by Mr. W. A. Mackenzie, Head of the Sea Fisheries Division at Hollandia. She took six months to build, local materials being used throughout. The vessel is 27 feet long and has a beam of 8 feet. She is equipped with an insulated refrigerated hold, with a capacity of one ton of fish. An 18 h.p. diesel engine gives her a cruising speed of 7½ knots.

Shortly after KEMBOONG began her fishing career, a second fishing vessel, KAKAP, and a third, KRAPOE, were launched. In all, six of these 3½-ton vessels will be built and stationed along the Geelvink Bay coast.

It is not only the vessel with which the Papuan fishermen have to familiarize themselves; the fishing methods, too, are new to them. The Sea Fisheries Division, too, is still experimenting with the latter.

Boats Leased To Fishermen

The craft are leased to interested fishermen for a certain percentage of the proceeds of the catch.

KEMBOONG has been leased to a group of Papuans from a village near Serui on Japen Island, Geelvink Bay. They have a reputation as fishermen, for, led by their village chief Aitai Karubaba, they used to catch about a ton of fish daily in the fishing waters near Sorong.

At present, Karubaba and his men make up the crew of KEMBOONG. Their current catches are not as spectacular as those off Sorong, because fishing grounds in the Hollandia area are definitely poorer. The main thing for them, however, is that they are gaining the experience required to operate this type of fishing vessel, and are using the new methods.

Thus, in helping to increase the protein content of the diet of their countrymen, they are also contributing to the economic development of their country.

SPC Plant Introduction Activities Expand

(continued from page 41)

cocoa experiment and propagation scheme. The main emphasis is on vegetative propagation of local and introduced clones, and also fermentation and drying experiments. An experimental fermentary and a Samoan-type drier have been constructed and put into operation. Necessary equipment for the laboratory manufacture of chocolate has been acquired and will be installed at this station.

Naduruloulou's collection of cocoa includes 16 clones, "Trinitarios" and "Forasteros", of which seeds and/or cuttings are available for South Pacific territories. The selections present are either from local trees or introductions from outside Fiji (from the Imperial College of Tropical Agriculture in Trinidad, Grenada, Keravat Experimental Station in New Britain, and Western Samoa).

The collection of coffee includes 24 varieties of "Arabica", 5 varieties of "Robusta" and one of "Liberica", of which seeds are now available for distribution.

The black pepper collection at Naduruloulou includes 7 different varieties, of which cuttings are available for distribution.

Naduruloulou Plant Material Being Distributed Throughout Pacific

Territories of the South Pacific are showing an increasing interest in the plant material available at the Naduruloulou plant introduction station.

During the past two years a large number of coffee seedlings, rooted cuttings of black pepper, cacao pods and rooted cuttings, as well as some other useful plants have been distributed to several territories in the South Pacific including American Samoa, British Solomon Islands, New Hebrides, French Polynesia, Guam, New Caledonia, Niue, Papua and New Guinea, United States Trust Territory of the Pacific Islands, and Western Samoa.

A large amount of plant material was also distributed in Fiji.

During 1958 and 1959 several varieties of Arabian coffee, black pepper, cocoa, breadfruit, taro and pandanus were introduced at the Naduruloulou plant introduction and quarantine station. At the end of 1958, an interesting introduction of "Amelonado" cocoa was made from Malaya. After a period in quarantine on Bekana Island, the seedlings were planted in an isolation block at Waimaro, Tailevu. Pods and rooted cuttings from this "Amelonado" will be available for distribution after two or three years.

Other interesting and useful introductions made at Naduruloulou included an Hawaiian wilt-resistant tomato, a macadamia nut tree selected for thin-shelled, high-quality nuts, tea shrubs and a tropical basket willow.

The few facts quoted above concerning the work of the Commission's plant introduction service show that it has already proved of practical value in the improvement of economic conditions in the South Pacific islands.

Diseases And Biological Control In Rhinoceros Beetles

Larva exhibiting symptoms of Heidenreich's disease. This illustration —and those opposite— are among the many appearing in Dr. Surany's report.

With the above title, a report embodying the results of a four-year study of the diseases of rhinoceros beetles, carried out for the South Pacific Commission by Dr. Paul Surany, insect pathologist, has been published as SPC Technical Paper No. 128. It is reviewed below by . . .

B. A. O'CONNOR*

THIS beautifully-produced publication embodies the results of several years of work by Dr. Surany in Africa, South-East Asia and the South Pacific on the diseases which affect beetles of the genus *Oryctes*. Before discussing the contents of the publication, it may be of interest to present a brief outline of the research work carried out to date by the South Pacific Commission on control of the coconut rhinoceros beetle, *Oryctes rhinoceros* L.

When the pest was discovered in Fiji early in 1953, the Government of Fiji urged the South Pacific Commission to undertake an investigation into methods of control, and guaranteed the first year's expenses. The investigation was put in hand, and it proved unnecessary to call up the guarantee.

In January 1954 Dr. R. A. Cumber commenced a two-year programme of research in Western Samoa on the bionomics, ecology and control of the rhinoceros beetle. His results were published as SPC Technical Paper No. 107, *The Rhinoceros Beetle in Western Samoa,* June 1957. From February 1954 to April 1957, Dr. T. V. Venkatraman studied natural controlling factors of *Oryctes* in the South-East Asian and African regions, with special reference to parasites and predators. Beginning in October 1955, Dr. Paul Surany carried out an investigation of the influence of diseases on *Oryctes,* this project being financed by the Rockefeller Foundation. The Commission provided a grant of funds to make possible Monsieur J. Lepointe's investigation into the bionomics and ecology of *Oryctes* spp. in Madagascar from January 1958 to January 1960. Dr. C. P. Hoyt, the Commission's Technical Officer (Pests and Diseases), searched for parasites and predators in Madagascar from April to August of 1957. He has been in West Africa for eighteen months, and from there has sent to the South Pacific area large numbers of beetles which prey on the larvae of *Oryctes*.

The cost of this programme to date has been over £stg.60,000, of which the Rockefeller Foundation has contributed £25,000 and various South Pacific territories £12,000. A great deal of knowledge has been gained which will facilitate the future conduct of the investigation.

Record Of Painstaking Research

To revert now to Dr. Surany's paper, it is evident that much painstaking work has been accomplished during the years of research covered by the report, and the author is particularly to be congratulated on the excellence of his photomicrographs. The list of literature consulted is extensive, and should be of considerable use to future workers.

The first section deals with THE RHINOCEROS BEETLE AS AN ECONOMIC PROBLEM. The nature and extent of damage done to palms by *Oryctes* is described, and there are remarks on the native habitat of *O. rhinoceros* and the chronology and extent of its spread in the Pacific. A slight error occurs in the dates given for first observation of the occurrence of the pest in Tonga and Fiji, which are stated to be 1951 and 1952 respectively. The correct dates are 1952 and 1953. There is some discussion also of other species of *Oryctes* which attack palms.

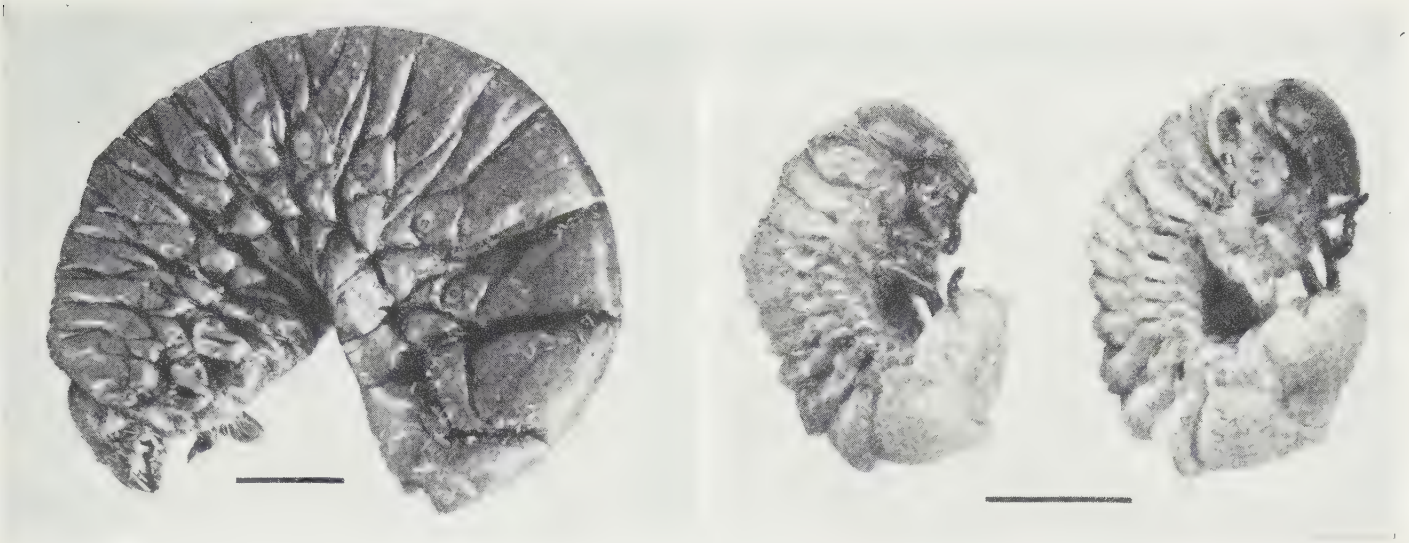
RHINOCEROS BEETLES, THEIR ECOLOGY AND CONTROL is the heading of the next section, which deals at some length with the life history and habits of *Oryctes* spp., the natural factors which control populations, and methods of artificial control which have been attempted. Among natural factors which are discussed are availability of host plants and larval breeding sites, intraspecific and interspecific competition, predators, parasites and diseases. Dr. Surany points out that "as far as is known, entomophagous insects in their natural habitat can be held responsible for only a partial control of *Oryctes* spp.", and advances various possible explanations for this state of affairs. One interesting observation made by him in 1956 was that *Oryctes rhinoceros* causes very little damage to palms in Penang, Malaya, and he notes that a similar observation was made by Friederichs in 1913.

Sections III and IV deal briefly with the history of previous work done on the pathology of *Oryctes* and with the experimental methods used in Dr. Surany's own studies. Some of the statistics mentioned in the section on experimental methods give an inkling of the immense amount of detailed work which was carried out. For instance, a stock of from 300 to 800 *Oryctes* larvae was maintained in the laboratory in individual containers, and each of the larvae was examined daily, or every other day if the number exceeded 500. The file of photomicrographs accumulated during the course of the investigation numbered more than 4,500 negatives.

Attempts were made to infest apparently healthy larvae by using inoculum prepared from diseased individuals. This was injected into the body cavity or mixed with the food. No positive results were obtained, and the author discusses some of the difficulties attendant upon such experiments.

Section V, DESCRIPTIVE PATHOLOGY OF *Oryctes* SPP, comprises half of the complete text, and includes an exhaustive description of the pathological conditions observed, illustrated by 49 excellent photomicrographs. The two most

* Senior Entomologist, Department of Agriculture, Fiji.



Above: Larva exhibiting symptoms of Maya's disease. Right: Mummification of prepupae, possibly resulting from a combination of Heidenreich's disease and Maya's disease.

important diseases are Heidenreich's ("Histolytic") and Maya's ("Blue") diseases. There is also some discussion of Rickettsiae, Bacteria, Fungi, Nematodes and Mites.

The author conjectures that Heidenreich's disease may be of virus origin. It affects the larvae of *Oryctes*, and observations in laboratory and field indicate that it may cause a mortality of 20% of the larvae population.

Maya's disease in some situations kills 80% of the larvae, and it also attacks pupae and adults. Diseased adults may exhibit a condition in which "vital organs, except for the heart, completely lose their definition". These adults are unable to feed, fly or reproduce, but may remain alive for weeks. Adults in which the disease is less advanced may appear normal, but the author speculates that their capacity for flight, feeding and reproduction may be greatly impaired.

Combinations of Maya's and Heidenreich's diseases may occur. The author draws attention to a mummification of prepupae which may be brought about by this combination, and notes its similarity to the "recroquevillement" recorded by Hurpin and Vago in *Melolontha*.

In Section VI, PATHOLOGY OF *Oryctes* —DISCUSSION AND CONCLUSIONS, Dr. Surany evaluates the results of his investigations in the South-East Asian and African regions, with some reference to the situation in the Pacific area. It is evident that the text was written before his final visit to the Pacific, when he undertook considerable field work and collected many specimens. We shall look forward to reading his description of this study, which will no doubt appear in a future publication.

He inclines to the opinion that the two principal diseases in South-East Asia and Africa are endemic, and transmitted through the egg of *Oryctes*, and points out that this could mean that the development of pathological conditions in the host could be independent of density-dependent factors. Larval cannibalism and the disintegration of diseased grubs in feeding sites are also indicated as possible means of transmission of the diseases.

The theory is advanced also that, apart from the mortality caused in the immature stages of *Oryctes*, diseases may have a decisive influence by their effect on adults. Not only the number but the pathological condition of adults could be important, because weakened adults may be unable to fly to the crowns of palms, or, having flown there, may be able to cause only superficial damage.

In this connexion he cites the frequency of damage to only the distal portions of fronds in South-East Asia and Africa, compared with the more severe damage to the proximal portion which often occurs in the Pacific area. He goes on to say that "there seems to be no doubt, however, that the problem of biological control in *Oryctes* is essentially a question of consequences of pathological conditions in adults". It should be noted in passing that the distal type of damage to fronds is the rule in Fiji, where there has been no really severe damage to palms during the seven years since the rhinoceros beetle was first recorded there. The fact that the pest almost certainly reached Fiji from Samoa, possibly by way of Tonga, raises the question whether the distal type of damage is due merely to low populations of adult beetles, since the beetle in Samoa can produce the more severe type of damage.

It is known that other species of Lamellicorn beetles exhibit symptoms of disease similar to those found in *Oryctes*. Dr. Surany gives an interesting account of the rise and fall of populations of the Lamellicorn beetle *Clemora smithi* in Mauritius, to which island it was introduced from Barbados. In Barbados it has never been a pest of consequence, but it became a serious pest in Mauritius. However, Dr. Surany states that: "For the present, *Clemora* has ceased to be a dreaded pest in Mauritius, as it had been for decades after its introduction". The conclusion is that Maya's disease, which was originally described from *Clemora*, and which commonly occurs in larvae in both Barbados and Mauritius, has brought *Clemora* under control in the latter island.

The symptoms of Maya's disease are commonly noted in *Oryctes* grubs in the Pacific area, and the disease often appears to cause heavy mortality among the larvae. We shall have to await the results of Dr. Surany's investigations in this area before we can speculate on the pathology of the adult beetles. However, it seems possible that in all areas, certain types of disease may have been present in the native Lamellicorns and may have affected immigrant species such as *Oryctes* and *Clemora*. The author does not discuss this possibility.

Dr. Surany's paper is a most carefully prepared and thought-provoking publication. His work can be of no immediate practical help in the control of *Oryctes*, because the pathogens, if any, which cause Maya's and Heidenreich's diseases and their means of transmission are unknown. However, a foundation has been laid upon which it will be possible to build in the future.

Diseases and Biological Control in Rhinoceros Beetles by Paul Surany. SPC Technical Paper No. 128, March, 1960. 62 pages, 82 photographs, 252 refs. South Pacific Commission, Nouméa, New Caledonia, 6/- stg.

Mother-And-Child Welfare In Papua And New Guinea

To maintain and improve the health of mothers, infants and children in Papua and New Guinea is the task of the Infant, Child and Maternal Health Division of the Department of Public Health in that territory.

Dr. Joan Refshauge, who is in charge of the Infant, Child and Maternal Health Service, makes a roadside check on a child.

THE Department of Public Health in Papua and New Guinea is divided into seven functional divisions, one of which is the Infant, Child and Maternal Health Division. Its purpose is to maintain and improve the health of mothers, infants and children, and to this end it conducts "The Queen Elizabeth the Second Infant, Child and Maternal Health Service".

It also receives material assistance in this work from the religious missions, and conferences between Administration and mission staff are held periodically so that all may gain from individual experiences.

The work of the Service has many aspects: infant care, care of the pre-school child, school medical inspections, maternal care, health education, and training of girls in infant welfare, midwifery and pre-school duties.

Further, while preventive medicine is the basis of the work, treatment of minor ailments is still undertaken.

Ante-natal And Infant Clinics

The Infant, Child and Maternal Health Service was not established as a separate section of the Department of Health until 1948. However, the work of the Service was not entirely new to the villages in the Port Moresby area.

After World War II, with the serious shortage of medical personnel in the territory, the Medical Officer in Charge at Port Moresby—Dr. Joan J. Refshauge—had found it necessary, because of the number of children being admitted to hospital suffering from malnutrition, to open an infant clinic in 1947. Later in the same year, at the request of the London Missionary Society, an infant clinic for the village people of Hanuabada was established.

Dr. Refshauge attended as regularly as hospital and general medical duties would allow, and supervised the work of the missionaries. The experience gained at Hanuabada provided the basis for all infant welfare work which has since been carried out in the territory.

Once it became obvious to the village people that children attending the clinics were healthier, this aspect of the work of the Service was firmly supported. Mobile clinics which could serve many villages and patrol a wide area became a feature.

The efforts of the Service to provide ante-natal care initially received many setbacks, for the people associated any casualty with the attention given. But with the increased sense of well-being of the women enjoying this care, the lessened obstetrical complications, the decrease in still-births and neo-natal and maternal mortality, this part of the work became increasingly popular.

By June 1959 there were 13 central clinics and 316 mobile clinics—serving 1483 villages—in operation. Regular clinics were also being held at 19 Administration hospitals, and reports were being received by the Administration from 108 mission stations on their activities in this field.

Health Education

Health education has been part of the work of the Service since its inception. Guidance in diet has been a feature and, with the co-operation of the Agriculture Department, various foods have been introduced for cultivation.

The Education Department has also co-operated in this aspect of the work. Courses in hygiene and mothercraft have been introduced into the schools for the senior girls and classes in health education are given to members of Women's Clubs.

Radio talks, pamphlets, posters and articles in local papers are other media which are used by the Service to improve health education in the territory.

Pre-School Activities

These became the responsibility of the Infant, Child and Maternal Health Service in 1954. By June 1959 there were 18 Administration pre-school centres, with a total enrolment of 472 and a daily average attendance of 376.

The centres are operated by local pre-school committees and the Administration provides up to 60% of the building costs. The Administration also provides the services of qualified pre-school

(continued on page 60)

Margareta, a Chimbu girl, washing a baby as part of her nurse's training at the Aaiho Infant Welfare Centre, Papua.

This harvester was made available to the Co-operative by the Department of Agriculture for harvesting this year's crop.

Aided Self-Help Produces Rice In New Caledonia

An excellent example of aided self-help is provided by the rice-growing co-operative operated by the villagers of St. Louis, twelve miles east of Nouméa. It was set up with official assistance in 1958, when 27 acres of rice were grown. This year, 50 acres have been harvested.

By L. F. RUMEN and R. H. BOYAN*

TWELVE miles east of Nouméa, on flat, low-lying land owned by the Mission of Saint Louis, a group of New Caledonian villagers has this year harvested 50 acres of rice.

Rice has been grown in the vicinity of Saint Louis for upwards of 40 years. In 1958 villagers formed, with the help of the Service of Technical Assistance for Co-operatives (Ministry of Co-operation), the Rice Growers' Agricultural Co-operative Society of Saint Louis, which then planted 27 acres in rice.

This progressive movement received excellent support from several quarters, and altogether the venture provides a good example of aided self-help.

The land is particularly suitable for rice growing. The Catholic Mission of Saint Louis made it available on a basis of rental of 10% of the crop in kind. The agreement for the use of the land in this way is for nine years as from July 1, 1958, but may be terminated by the Co-operative after either three or six years from that date.

When the Society was started in April 1958, 60,000 Pacific francs (£stg.241/4/1) in capital was subscribed by 23 members. This was insufficient as working capital for the venture, and a loan of 300,000 Pacific francs (£stg.1206/0/7) was granted by the Credit Society of New Caledonia.

Assistance From Agriculture Department

Further assistance was received from the Department of Agriculture in a variety of ways. Technical advice was supplied, a tractor was hired out to the Society for preparing the soil for planting, and, later, a large harvesting machine was similarly made available.

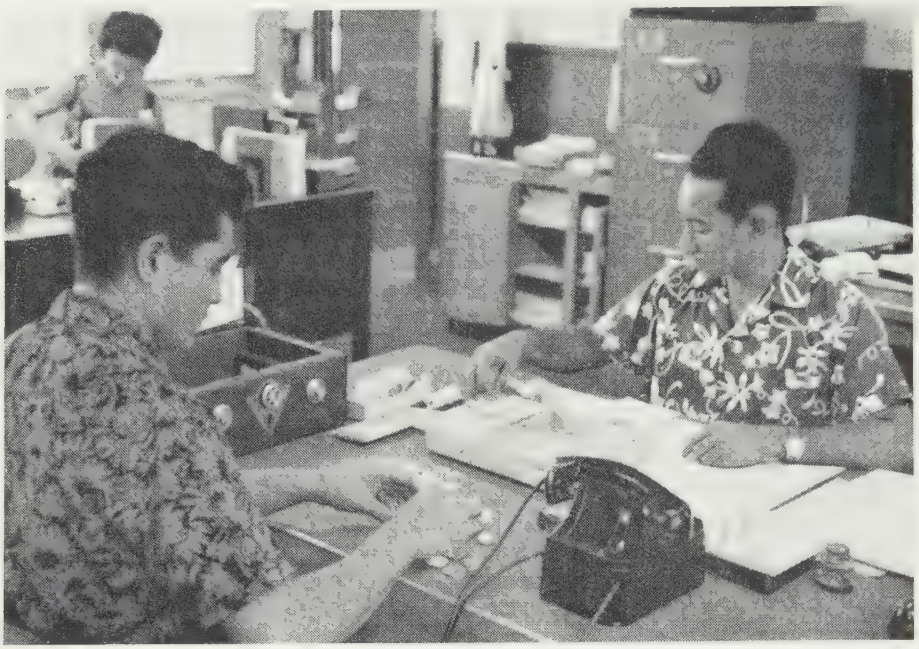
Encouragement was also given by a private planter who gave technical advice and processed the paddy through his own mill. Further Government assistance is given by way of a price subsidy for all rice sold in Nouméa.

While the operation is largely mechanized, a certain amount of hand labour is necessary from the members. A record is kept of work done so that each member may be paid, and, in addition, share in any surpluses in proportion to the value of work done. For the present, however, the members are concentrating on efforts to repay the advance from the Credit Society of New Caledonia.

* M. Rumen is Assistant Co-operatives Officer, Ministry of Co-operation, New Caledonia; Mr. Boyan is Co-operatives Officer, South Pacific Commission.

Members of the Co-operative harvesting by hand part of the crop that could not be reached by the mechanical harvester.

Ponape Fishermen Set Up Successful Co-operative



Established only eighteen months ago, the Ponape Fishermen's Co-operative Association has made excellent progress. In addition to supplying the local market, the Association is now exporting surplus fish, quick frozen, to Truk, the Marshall Islands, and Guam.

By STEWO PELEP*

Daily cash count being made at the Association's headquarters. Right: Mr. Stewo Pelep, secretary-treasurer; left, Mr. Gustave Weilbacher, store manager.

BEGINNING in May 1959 with a modest capital of $490.00, the Ponape Fishermen's Co-operative Association has steadily grown in assets and business acumen. The Co-operative was established primarily to provide a market place to which fishermen could bring their catches and be paid for them.

The formation took place after careful consideration by the local fishermen through meetings with the District Administrator, Director of Agriculture and Fisheries, District Agriculturist, District Public Works Officer, and the people of the Island Affairs Office. These meetings were held at the Agriculture Station to discuss the possibility of establishing a fishermen's co-operative.

Mr. Boyan, the Co-operatives Officer of the South Pacific Commission, who was visiting Ponape at that time, attended the second meeting and was introduced to the group by Mr. William E. Finale, the District Administrator. Mr. Boyan addressed the meeting on co-operative movements, including the purpose and principles of co-operatives.

It was decided that one month or so should be taken for registering members. The fishermen who attended the meeting were made responsible for notifying others of what had been decided, of the date that registration of members would start, and the deadline. Registration concluded with 98 fishermen registered. Each contributed $5.00, and the resulting total of $490.00 provided the initial capital fund for the Co-operative's operations.

Executive Board Appointed

An executive board composed of seven men from various fishing groups was formed. It meets almost every month to discuss operating problems of the Co-operative, and recommends what improvements should be made. This board lays down policy and generally takes action for improving the Co-operative.

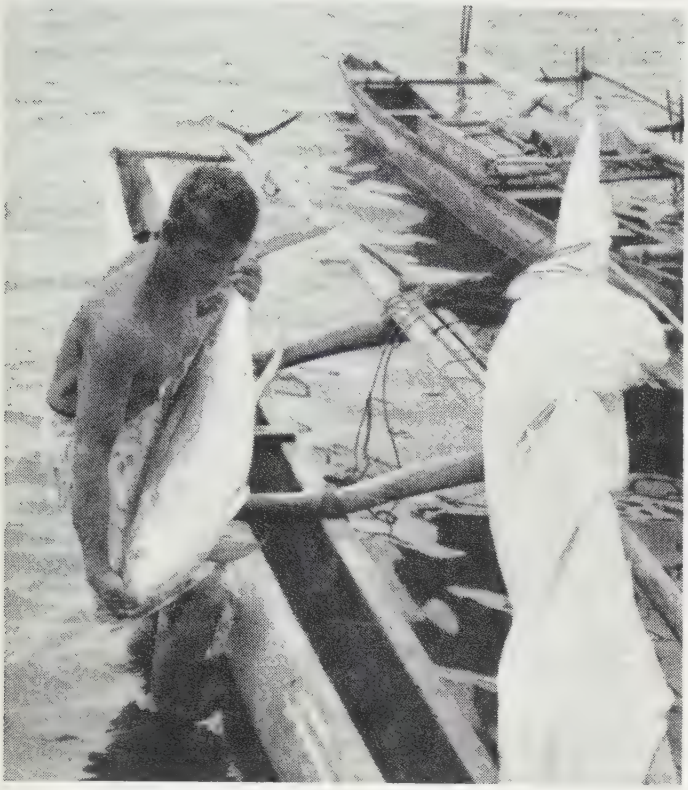
Operations began in May 1959. The Administration assisted the Co-operative by providing freezer space for storage and other facilities. Three people were appointed by the District Administrator from the Island Affairs Office to help get the operation started. Two men hired to run the market were trained by the Island Affairs people.

When operations began there was only $380.00 in cash to work with. This amount was enough for about four months. By then, purchase of fishermen's catches had increased to about twice the sales, which caused a shortage of cash.

During the first few months of operations, there were times when we had to refuse to buy fish from the fishermen because of lack of adequate freezer space. We could not store more than nine tons.

* Mr. Pelep is a staff member of the Islands Affairs Office of the District Administration, Ponape, Eastern Caroline Islands.

Fish ready for placing in quick freezing plant.



Tuna being unloaded by Kapingamarangi fisherman.

Frozen tuna wrapped and ready for shipment out of District.

Problem Of Surplus Fish Solved

When Mr. John Spivey, the Contracts and Programs Officer for the Trust Territory, visited Ponape, he was able to meet with the executive board of the Fishing Co-operative. The problem of the surplus fish was brought up at the meeting. The board asked Mr. Spivey to assist the Co-operative by finding a market for its fish outside the territory.

He was interested, and upon his return to headquarters contacted several prospective buyers. The Frank Edwards Company, Inc., was finally selected, and accepted all shipments of fish to Guam by our Co-operative. We were very pleased, and have since established good business relations with the purchasing Company. Now our problem is to get more fish for local people, and for shipment to other districts and Guam.

Surplus fish is exported to the other Trust Territory districts needing fish, or to other markets outside. Members are encouraged to put more effort in fishing in order that larger shipments can be made to Guam, for more income to them and to the district.

Records Reveal Healthy Growth

Our records show a healthy growth of the Co-operative since its inception. We have sufficient funds on hand as a result of the successful operations of the last ten months, and hope we will not get into any problem of shortage of cash.

The figures below show the total weight of fish purchased and sold, and the average of purchases and sales during the past months of operation:

PURCHASES

Total purchased	206,894 lbs.
Daily average of purchases	$89.66
Monthly average of purchases	$1,936.05

SALES

Total sold locally	169,581 lbs.
Daily average of sales	$102.55
Monthly average of sales	$2,461.25

We have been shipping tuna to Truk, the Marshalls, and Guam as surplus fish at 17 cents and 19 cents per pound. Several shipments of fish have been made during the past months of operation, as shown below:

TOTAL WEIGHT OF TUNA SHIPPED TO:

Truk	4,700 lbs. @ 17c.	$799.00
Marshalls	8,653.5 lbs. @ 17c.	1,471.10
Guam	33,955 lbs. @ 19c.	6,451.45
		$8,721.55

The members of the Co-operative are very proud of its steady progress, and are willing to devote more and more effort to develop it. Now they realize that anything can be accomplished by people through co-operative effort.

All In Ponape Benefiting

Both members and the people in Ponape are benefiting from the enterprise. Today people know that there is a fish market where they can sell and buy fish. More people are buying fish from the market instead of the canned product. One of our aims is to provide enough fish for our people here. We believe that if we have it available for sale at any time, people will learn to use it in their meals instead of expensive canned food

Our District Administrator, Mr. William E. Finale, has prepared a draft of the by-laws for the Co-operative. These have been translated into the local language so that members can read and understand them. They will be presented to the members for their consideration at a general meeting. If accepted, they will be forwarded to the High Commissioner for his approval.

Successful Self-Help Activity

The Ponape Fishermen's Co-operative Association has demonstrated how a group of local people can band together and set a small-scale industry going. It is an encouraging movement toward self-help.

A good feature of co-operatives is that they provide an educational process for their members, even to the extent of enabling them to understand democratic movements by which people work together to manage their own affairs for their mutual benefit. They learn many things from each other through discussions in meetings by sharing their ideas. They feel free to express their opinions and learn to understand equality and responsibility.

Yap mother palms. Yapese are traditionally instructed by their elders that the useful period of a mother palm is ten years, starting from the first year of bearing, and that it is during this period that the nuts best transmit qualities such as heavy production and vigour.

Traditional Coconut Culture In Yap

While it might be difficult scientifically to support certain features and beliefs concerning the traditional Yapese system of coconut culture described below, the results are apparently outstanding, fully justifying Yap Island's popular designation as "the coconut Eden" of the United States Trust Territory.

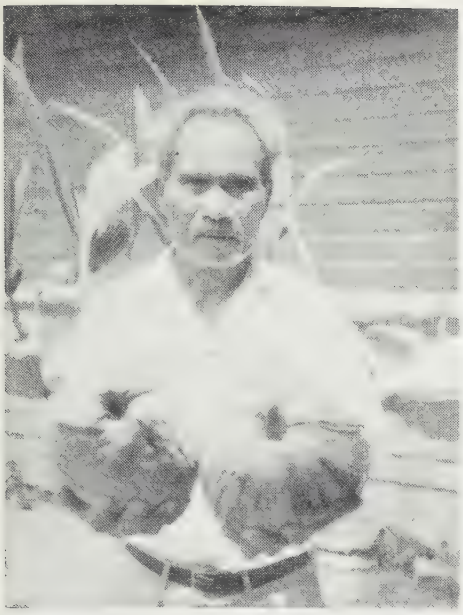
By S. BERT OGATA*

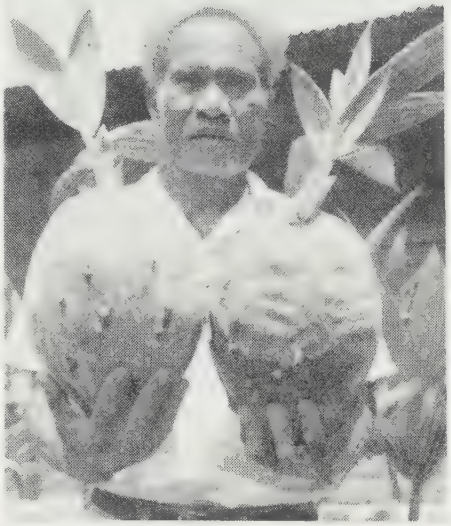
YAP District, one of six districts of the United States Trust Territory of the Pacific Islands, is part of the Caroline Islands Group lying within the area from latitude 7° to 10° north and extending from longitude 138° to 148° east. It consists of the Yap Islands and a string of coral atolls stretching about seven hundred miles eastward.

Yap itself, located four hundred miles south-west of Guam (Marianas Group), is made up of four major islands separ-

* Mr. Ogata is District Agriculturist of Yap District. He prepared this article at the joint request of Dr. Jacques Barrau, Executive Officer for Economic Development, South Pacific Commission, and of Dr. Alex Kroon, his predecessor, after they had inspected coconut plantations in Yap and been deeply impressed by them. It should be noted that neither the author nor the Trust Territory Administration is prepared to furnish either statistical data or scientific details and explanations of the system Mr. Ogata describes.—Editor.

Below: Method of suspending selected seednuts above the ground for sprouting, to discourage development of roots prior to planting. Right: Seedlings are traditionally selected for planting when the sixth leaf is fully developed.





The pictures on this page illustrate the traditional Yapese system of coconut culture. Above: Selecting seednuts and seedlings. Right: The seedling nut is bisected and the haustoreum and endosperm removed from the seedling half, which is then packed with soil. Below: One method of preparing the hole and planting the nut.

ated by narrow water passages and surrounded on the perimeter by a fringing reef.

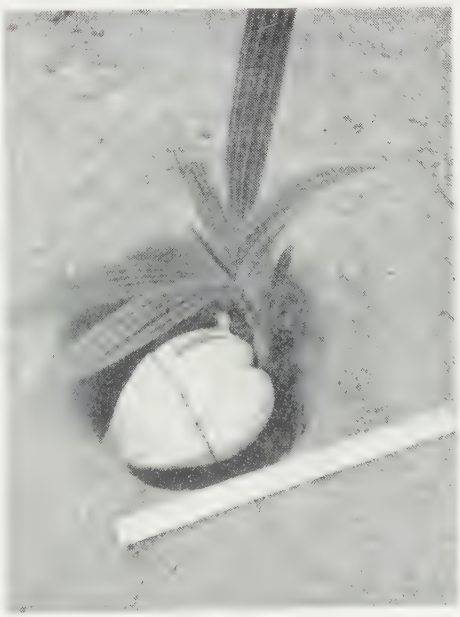
Yap proper consists of approximately 38.7 square miles of high volcanic islands. The climate is tropical, showing relatively little seasonal change, with average daily temperatures ranging between 75° and 85° F. Annual precipitation average is listed as 122 inches. The Administration seat is located at Colonia, which is the hub from which Yap's population of 5,622 is administered.

Yap Island has been designated as "the coconut Eden" of the United States Trust Territory. It is well known for its heavy-bearing coconut palms and superior quality seednuts which have been widely distributed as planting stock in the Caroline, Marshall and Mariana Islands during the last several years.

The origin of these outstanding coconut palms is unknown. The perpetuation and development of quality supposedly is the result of traditional Yapese methods of coconut culture. The author has studied this indigenous system of coconut cultivation, which is the basis of this article.

History

The elders of Yap recall the days when the selection of mother palms of the "Thifow" (ever-bearing palm) and "Nugel" (resting palm) varieties was extremely important, since their livelihood depended on the coconut groves. This was especially so in the past, when



An alternative method of cutting the seedling nut, packing it with soil, and planting.

the population of Yap was estimated as being well over 50,000.

This information on selecting mother palms, selecting seednuts and seedlings, plus planting methods, was secret, and was closely guarded by the several clans.

No written record has been kept of coconut planting in Yap, and methods were passed on by word of mouth by the elders of the clan. Uniform planting is non-existent because of the intricately-fragmented system of land ownership. Adequate spacing is given consideration in all plantings.

The author lists the divisions of importance of Yapese coconut culture and subsequently relates points of importance considered under each division. An extended study has been made, and interpretation and clarification of Yapese palm culture was gained through the assistance of Mr. Tamag Tamadad, a hereditary chief of Ruul Municipality, and Mr. Gabriel Gilrow, District Agricultural Extension Agent, who translated and verified the selected facts.

The system of palm culture is described as practised, and no attempt has been made to clarify or develop it.

The following are the main subdivisions encompassed under the Yapese system of coconut culture:

1. Mother palm selection.
2. Selection of seednuts.
3. Handling of seednuts.
4. Selection of seedlings.
5. Preparation of selected seedlings for planting.
   (a) Cutting of nuts.
   (b) Hole preparation.
   (c) Orienting of seedlings.
   (d) Physical handling of seedlings.
6. Location of good mother palms.

Here, only the half-nut attached to the seedling is planted. Alternate methods of preparing the holes are shown.

Mother Palm Selection

The useful period of a good selected mother palm is considered as ten years, starting from the first year of bearing. Yapese have been traditionally instructed by their elders that, genetically, the nuts produced by a selected palm during this period carry the hereditary characteristics of quality such as heavy production and vigour, and that this is the period of "transmission" in the life of the palm.

The "Thifow" variety of palm bears large-sized, conoid-shaped nuts with firm haustoreum, and the habit of bearing is continuous. The "Nugel" variety produces small-sized, avoid-shaped nuts with a soft haustoreum, and is further characterized by a complete break (rest period) in production every two years.

The "Thifow" variety is traditionally selected for copra production, and the "Nugel" for subsistence purposes.

Further varietal separation is made by nut colour, as follows:

1. Yarra (green).
2. Yarra Nikon (dark green).
3. Garbog Neyarra (light green).
4. Ameria (medium yellow-brown).
5. Ameria Nikon (dark brown).
6. Garbog Niamoria (light greenish-brown).
7. Garbog (dark brown).
8. Yugubol (yellow tan).
9. Meechurua (pinkish).

Naturally, colours are determined prior to maturity. The Garbog, or dark brown, is preferred in all selections.

The Yapese believe that a "Thifow" palm may change into a "Nugel" during its period of growth. On the other hand, a "Nugel" palm will never turn into a "Thifow".

Selection Of Seednuts

As stated earlier, the "Thifow" variety is selected as mother stock for copra production. After mother palms have been designated, the seednut selection process is initiated. The best seednuts are said to be produced during the first year of the palm's bearing period, and this is further extended to the nut on the tip of the cluster.

Generally, two nuts from the tip of the cluster are taken, starting with the fourth inflorescence, during the first year's bearing and extending over a ten-year period. As traditionally practised, this is considered the most important procedure in the Yapese method of seednut selection, and perhaps merits further

investigation. Medium-sized, spherical-shaped nuts are preferred.

Handling Of Seednuts

Seednuts are hung high above the ground for sprouting, to discourage development of roots prior to planting. It is said that this procedure develops vigour and reduces infestation and infection by insects and disease.

The Yapese do not believe in ground nurseries. They feel that the seedlings lose vigour if, after their roots are allowed to develop in the ground, they are subsequently uprooted during transplanting. This theory of coconut propagation, then, is based on development of the seedling up to the time of selection for planting, and relies entirely on the properties of the nut itself.

Selection Of Seedlings

Seedlings are traditionally selected at the stage when the sixth leaf is fully developed. Leaves should be broad and leaf petioles short. Also, seedlings with straight, thick stems and free of insect or disease infestation are preferred. Roots should be developed so that they are clearly visible and are the same in number as the leaves.

Preparation Of Seedlings For Planting

1. Cutting Of Nuts. Nuts of the selected seedlings are cut in half, vertically or diagonally, and the haustoreum and endosperm removed from the remaining half of the nut that is attached to the seedling. The Yapese feel that if the haustoreum and endosperm are left to deteriorate at the base of the seedling, their subsequent fermentation will retard its growth in later months. The Yapese have been doing this for generations. It is a practice that is interesting, and possibly unique.

2. Hole Preparation. Prepared holes 1′ x 1′ x 1′ are considered adequate under good soil conditions. The seedlings must be planted below the surface and the holes allowed to fill naturally over the years with soil washed in by rain.

3. Orienting Of Seedlings. The Yapese method demands that the head of the seedling be faced to the east when planted, with the nut end facing west. Obviously the Yapese of the past gave much serious and conscientious thought to coconut culture. No definite reason is given for this procedure.

4. Planting Season. The Yapese system also dictates that all plantings be carried out during the rainy season, to ensure best results in root settlement and rapid establishment of seedlings in the field.

Location Of Good Mother Palms

Mother palms are usually selected in close proximity to villages and home sites for various reasons, of which the following are the more important:

1. Correlation of the presence of body odour and palm growth and production is considered important. (More likely the by-products are important, i.e., garbage, ashes, smoke produced by normal human living.)
2. Care and cultivation of selected palms are more easily accomplished.
3. Closer surveillance and easy seednut collection are ensured when palms are located near homes.
4. For reasons of prestige and convenience for exchanging nuts with others having good mother palms.

Summary

Such were the general rules of coconut culture as traditionally practised by the Yapese in the past. They are still carried on to some degree, even today.

It is generally considered by the agricultural representatives of the Trust Territory Administration that the Yapese deserve recognition for developing a somewhat unique system of coconut culture. The Yap system compares favourably with accepted methods as presently practised by other coconut-producing areas of the Pacific today.

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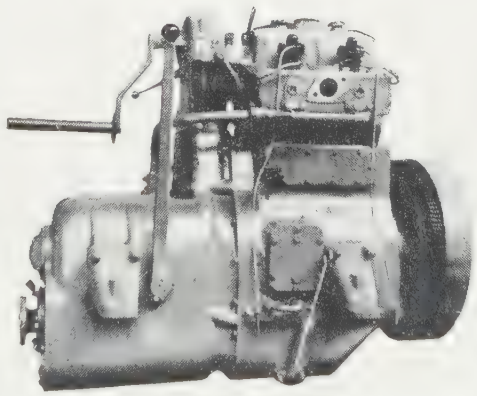

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The women who planned and carried out the women's activities programme in Fiji discussing a flannelgraph in the Women's Interests Office in Suva. L. to r.: Lusiana, Fijian home economist; Miss Marjorie Stewart, and Miss Ruth Robertson, women's interests officer for Fiji.

Fiji Women Enthusiastic About Club Work

After spending six months in Fiji helping in a programme to stimulate interest among women there in club activities, the Commission's women's interests officer briefly reviews below the very encouraging results.

By MARJORIE STEWART

TRAINING courses for voluntary leaders proved the main theme of a stimulating six months' visit to Fiji. The third Leadership Day for Suva organisers of women's and girls' clubs, held on August 6, brought this visit to a close.

The day's programme centred round a survey of community needs and opportunities, followed by techniques for running club programmes. The audience entered enthusiastically into lively demonstrations of a frivolous Panel ("that cosmetics are harmful to women both physically and psychologically"), a lively Quiz, and a Debate (the speakers being an Indian, a Fijian, a Filipino and a European), while an excellent flannelgraph demonstration was given by a new Fijian club leader.

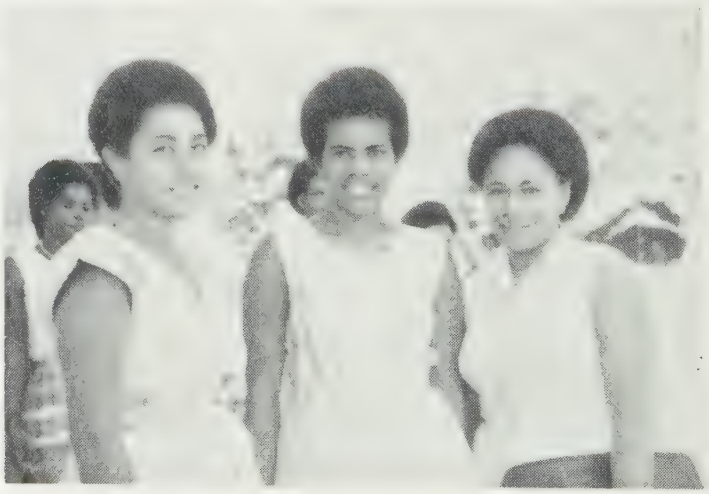
These Day Courses, held about every sixth Saturday, have been remarkably well attended by busy teachers, housewives and students. Running parallel on the same day are courses for the cooking and sewing leaders on content and teaching method.

An important feature of the day was a report given by two young leaders concerning new clubs for teenagers who have left school—one a city club, one a rural.

The city club had been started by members of the Pan Pacific and S.E. Asia Women's Association, and was only three weeks old. Attendance varied between 40 and 50. There was a promising team of volunteer instructors to teach sewing, cooking and English, while the girls themselves—Fijian, Indian, part-European—chose their own office-bearers as well as games and song leaders who by the second meeting were themselves teaching dances, games and songs after attending two training classes at the Women's Interests Office.

The other club report was given by the Head Girl of Adi Cakobau School, a Fijian girls' boarding school, where the sixth-form girls had started a club for 16-20 year olds from the neighbouring villages. A popular programme of sewing and cooking was conducted in the homecraft rooms of this exceptionally beautiful school, and games took place on the playing fields. Numbers were such that they were planning to split into two groups, the older to be a Young Married Club. Leadership was being developed among the club members and as the sixth formers became increasingly absorbed in

Below: A sewing group at the leadership training course held at Savusavu, Vanua Levu, in May. Ninety-four women attended. Right: Three teachers who helped with the interpreting.



Recreation is an important feature of the programme for organized women's activities. Left, a singing session, right, Miss Stewart conducting a game.

their examination work, the younger forms were to take over the management of the club.

Experience of such extension work is an invaluable foundation for future development as the Adi Cakobau girls go forth to all parts of Fiji at the end of their school career.

Between March 21 and June 30, four-day leadership courses in women's club work were conducted in nine rural centres in Fiji, as well as one-day courses in Suva. The interest and enthusiasm aroused as a result have been remarkable.

Close on six hundred women attended these sessions, and everywhere it was obvious that all taking part were consumed with the desire to learn practical things. Some of those attending represented several already well-established women's organizations, while teachers and nurses often took part.

The training programme was planned by the women's interests officer for Fiji, Miss Ruth Robertson, and the author, working with the Nutrition Section of the South Pacific Health Service and various Government Departments.

Continuing Enthusiasm

The curriculum of the four-day training courses, and the way they are conducted, were described in the last issue of the *South Pacific Bulletin*.* The many letters received subsequently from districts where they have been held show that the interest they aroused has continued unabated, and that follow-up work is being enthusiastically carried out.

One correspondent from an outlying island in the Fiji Group writes: "The new committee has visited four villages where they are forming new clubs. The women have improved their villages by asking the men about digging latrines and making rubbish pits; animals are no longer let loose; they have beautified their surroundings by planting flowers round their compounds and near the roadside; the menfolk are very pleased. One group is attending to the children's sores each morning."

Another area suggests having a choir and is hoping to secure a bus and arrange an outing for the famous Hibiscus Festival. The Fijian secretary of that group writes:

"The fact that through the club one learned not to be selfish but to pass one's knowledge to the rest of our fellow members was greatly appreciated by the women in the village and they now realise that it does pay to be a member of a club. On June 2nd there was a meeting for the menfolk in this district. The clubs decided to prepare an afternoon tea for them. Our aim was to show the outcome of a few of the many good things brought about among the ladies of those villages where clubs have been formed. Each woman prepared a plate and they, looking at their own work, were both very pleased and proud of it. One can just imagine what the men thought, having seen and tasted the work done by their own wives and relatives. As a result, the men have donated to the clubs on June 13th the sum of £14. As for sewing, men are proudly wearing sports shirts made by the women of the club and how cheaper it is than having one made by a tailor."

One man teacher writes: "I sincerely appreciate the results of the effort our two delegates have achieved on returning. My senior girls for the first experience of their lives are taught to make jam from local fruits. We found jam making a very quick way of making money-raising fund for founding a Home Science class for the school. We also have plans for other girls' organisations next year." The two ladies mentioned are not confining their activities to the school. They have already made a tour to an outlying village where they helped to organise a Women's Association.

A head teacher near that village reported that the women are enthusiastically beginning with their cooking which the menfolk jokingly admitted as the first essential. The Buli's wife remarked: "We do not only benefit with this new thing—but creates amongst us a fine spirit of friendship and co-operation".

Many other letters from near and far tell of newly aroused enthusiasm and practical projects in sewing, cooking, gardening and sanitation. One club asked that there should be a radio talk for those who still know nothing of women's clubs.

As you can imagine, very little can be done in a four-day course beyond rousing interest and introducing a few ideas to go on with. Yet the demand for instruction is so strong that leaders are prepared to come in from distant rural areas to Suva for longer courses on particular subjects.

In July a ten-day course was held, devoted to club management, programme planning and the place of women in the community.

Representatives attended from all the areas which had been visited, and from 9.30 throughout the day and often into the evening they took part in theoretical and practical sessions and went out on observation visits.

Sessions taken by outside speakers—Fijian, Indian and European men and women—included challenging talks on "Customs and Family Life in a Changing Fiji", "The School and the Home", "Co-operatives and Thrift", "The Fly and the Worm", "Personal Hygiene". Five groups prepared topical sketches illustrating varied functions of a club in the community which were presented on the closing afternoon to an audience of friends and helpers.

Observation visits were paid to the Corona Society and four other flourishing women's clubs, both inter-racial and Fijian, a girls' hostel, a Fijian day school and the Fijian Adi Cakobau School,

(continued on page 70)

* *Training Women For Leadership In Fiji*, by Marjorie Stewart, SOUTH PACIFIC BULLETIN, July, 1960.

Rice-Growing Successfully Established At Merauke

That the young marine clays along the southern coast of Netherlands New Guinea are eminently suitable for mechanized rice growing has been successfully demonstrated by a four-year pilot project just completed at Koembe. As a result, the main project at nearby Merauke will soon be launched. It is intended to make the territory self-supporting in rice.

By J. S. VOLLEMA*

Experimental plot on "undisturbed" young marine clay west of the Maro River. Variety Blue Bonnet, 63 days old (12 May 1959).

IN former reports[1] a description was given of the research work on mechanized rice growing in the pilot polder Koembe near Merauke, Netherlands New Guinea, and of the results obtained in 1956 and 1957. In this article, the work and results in 1958 and 1959 are described.

The Third Rice Crop

The sowing programme for the season 1957/58—277 acres in the northern part of the polder and 163 acres in the southern part—was upset by abnormally heavy rainfall in December 1957 (17" against an average of 7¼").

The mechanical fertilizing and sowing in dry soil which was started early in December in the northern area had therefore to be discontinued and the operation carried out by hand, because, when wet, this type of soil has non-carrying patches in which tractors and other heavy implements are liable to get bogged. For the same reason the mechanical harrowing of the weeds, which were abundant on account of the rainy weather, could not be carried out.

Although the latter problem was solved by using a mud-roller and a herbicide (Nolachite), time was running short, and the sown area had to be reduced to 169 acres in the northern part and 100 acres in the southern part.

In March 1958 the mandars (*Porphyrio porphyrio*, a kind of moorhen) arrived in great numbers, and were harassed without respite from sunrise till sundown. During March, April and May some 4500 were shot. Then the invasion ended and the "battle of the mandars" was over, with negligible damage.

The riceborer (*Scirpophaga* spp.) caused some trouble, but was kept in check by regular spraying with Toxaphene. However, in the grain-forming stage another serious insect pest appeared, the stinkbug (*Leptocorisa* spp.). There was a strong indication that this pest could also be controlled by spraying with Toxaphene, but unfortunately the stock of this insecticide ran out and could not be supplied in time. Consequently the damage (a high percentage of empty grains) was considerable, especially in the last sown parcels of the south polder.

By way of experiment an area of 20 acres in the southern part was irrigated and sown in July 1958. This "dry season" crop developed well and gave a good yield (2491 lbs. per acre) in November. After ploughing and harrowing, so many of the spilled seeds germinated that the field was irrigated again and a new crop allowed to develop.

In the northern polder, yields of the parcels varied from 120 lbs. dry paddy per acre to 1945 lbs. per acre; in the southern polder from 1074 to 2491 lbs. per acre, with an average of 1649 lbs. per acre. The total yield in 1958 was 174 metric tons, or 1343 lbs. per acre.

The overall average, though higher than in 1957, was still rather disappointing. In the northern part this was mainly due to physiological disorders. In some parcels the crop was practically a failure for this reason. The crop in the southern part was healthy and sturdy, but yields were below expectation owing to stinkbug damage.

The Fourth Rice Crop

Meanwhile, preparations were made for a more extensive sowing programme in the season 1958-59. Early in December 1958, 425 acres in the northern and 163 acres in the southern part had been carefully prepared by ploughing, harrowing, levelling and fertilizing. The rains came towards the end of this month and during January-March 1959 a total of 588 acres were sown.

On the whole the crop developed satisfactorily, and was kept practically free from damage by regular spraying rounds against insects and by shooting harmful birds. The mandars appeared only in small numbers, in contrast to the previous seasons.

Weed growth was again abundant, especially on the better soil of the southern part, but it could be kept in check by harrowing, well-timed flooding, and spraying with Nolachite.

In April 1959 the spontaneous crop in the above-mentioned plot in the

[1] *SPC Quarterly Bulletin*, issues dated January 1957 and July 1958.

* Dr. Vollema, who is a graduate of Wageningen University (Tropical Agriculture), is at present engaged in agricultural planning with the Netherlands New Guinea Directorate of the Ministry of Home Affairs at the Hague.

southern part was harvested, giving 2404 lbs. per acre. Thus, this parcel had given two yields in one year, totalling 4895 lbs. per acre.

During May-August 1959 the main crop was harvested, and this time the expectations of a good yield were really fulfilled. The yields in the northern part ranged from 619 lbs. per acre to 2989 lbs. per acre and the average was 1664 lbs. per acre. In the southern part they varied from 1434-4032 lbs. per acre with an average of 2713 lbs. per acre.

From the whole area of 608 acres, 546 metric tons, or 1979 lbs. were obtained, per acre, a much higher average yield on a much greater area than in the first three years, as is shown in the graphs.

The strikingly better results in the season 1958-59 may have been enhanced by the favourable natural conditions in this period, but there is little doubt that they were mainly due to the fact that the soil had become more arable and—last but not least—to research and experience.

Appraisal Of Results In The Pilot Polder

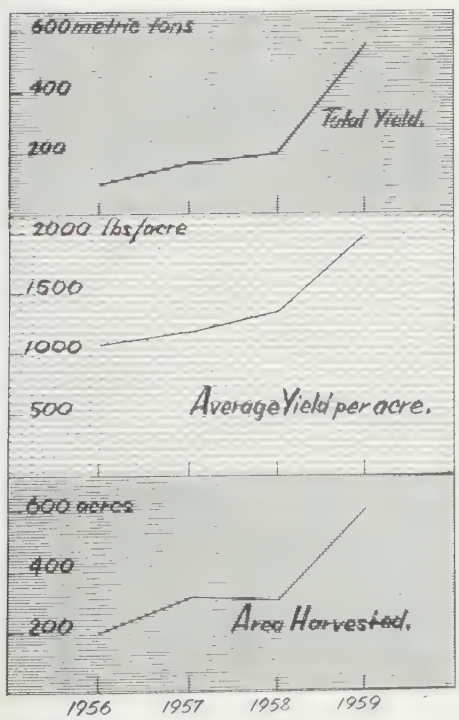
The research work and the practical experience in the pilot polder have led to the following basic knowledge:

The silty loam of the northern part has three unfavourable properties:

(i) It is extremely poor in plant nutrients;

(ii) it has an irregular pattern of non-carrying patches when in wet condition, and

(iii) it has a tendency to become, after irrigation, an unfavourable medium for the rice plant, causing physiological disorders and depressed yields.



These graphs record total yield of rice, average yield per acre, and area harvested, for the years 1956-57-58.

Experimental plot on levelled "beds and ditches" area (4 June 1959). Note poorer growth of rice on the scraped-off bed (centre) as compared with that growing on the filled-up ditches on either side.

It appeared that the poverty could be easily corrected by applying artificial fertilizers and green manures. In field experiments it was found that the initial optimal dose per acre is approximately 90 lbs. double superphosphate, 110 lbs. muriate of potash, 110 lbs. sulphate of ammonia and 265 lbs. lime, which can after a few years be reduced to an "upkeep manuring" of 45 lbs. double superphosphate, 65 lbs. muriate of potash and 110 lbs. sulphate of ammonia.

The non-carrying defect could possibly be corrected by increasing the clay content of the upper layers of the soil, which could be done by deep ploughing. However, this would be a costly measure.

Pot experiments indicated that the physiological disorders can be avoided, or at least mitigated, by drying the soil before planting. In field experiments the beneficial effect of aeration was achieved by thoroughly cultivating the soil in the dry season and by sowing in dry soil. This procedure led to a yield increase of approximately 35%.

In practice a similar increase was recorded by sowing in well-prepared dry soil, by intermittent flooding and draining of the fields, and by using varieties with a short ripening period, e.g., Skrivimankoti.

The medium young marine clay of the southern part is fairly fertile, though by no means rich in plant nutrients. It has in flooded condition a good carrying capacity for machines, and it is reasonably cultivable when dry.

Field experiments have shown that a high production level can probably be maintained with a relatively small yearly dose of artificial fertilizers (about 65 lbs. double superphosphate and 65 lbs. sulphate of ammonia per acre) and green manuring. On this type of soil, sowing has to be done in irrigated fields. The abundant weed growth can be kept under control by well-timed irrigation and by using herbicides.

Of the rice varieties tested so far, Nickerie has given the best results.

Summing up, the work in the pilot polder, which extended over four years instead of the originally planned three, has led to the following conclusions:

It has been definitely ascertained that of the two main soil types of the pilot polder, the fairly fertile medium young marine clay of the southern part is eminently suitable for rice growing. A very satisfactory production level has been reached, and moreover it has been proved that an extra dry season crop can, at least occasionally, be raised.

The poor silty loam of the northern polder offers more problems, but with appropriate measures it has been possible to obtain reasonable rice yields on this type of soil.

Thus it can be stated that the investigations and the practical experiences in the pilot polder have been of fundamen-

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tal importance for future rice growing in the southern regions of Netherlands New Guinea. The Koembe staff, and in particular Research Officer Homans and his co-workers, can certainly look back with satisfaction on a job well done under difficult circumstances, which called for endurance and ability.

While the main purpose of the pilot polder has now been fulfilled, some investigations are being continued, and a few more will be carried out in this area. All efforts are now concentrated on the main project. The future purpose of the pilot polder will probably be as a seed farm.

The Main Project

As there is no conveniently situated, topographically suitable, and large enough area of medium young marine clay available, other possibilities were examined.

The young marine clay area between the rivers Koembe and Maro was considered to be attractive, and here it is expected to establish a large mechanized rice growing plantation, the so-called Merauke project. This area of about 12,000 acres is favourably situated opposite Merauke town.

Investigations have shown that the Koembe river has ample discharge for the year-round irrigation of the area. A feasible scheme of irrigation and drainage canals and dykes for the empoldering of the latter has already been worked out.

Extensive soil investigations have revealed that the young marine clay is physically very similar to the medium young marine clay, but there are distinct differences in the chemical properties of the two soil types, the younger clay being much richer in minerals.

Pot experiments have confirmed that the topsoil of the latter is highly fertile and ideally suitable for rice growing, in contrast to the alkaline subsoil, on which the rice plants developed very poorly.

This fact presented quite a problem and called for further research, as the top layer is comparatively thin. According to soil analysis, the subsoil as such contains free lime, an extremely high percentage of magnesium and high percentages of sodium, manganese and borium.

However, further pedological investigations, comprising comparative studies of closely-related young marine clay soils east of the Maro River, where rice growing has been for many years an established practice, demonstrated that the young marine clays west and east of the Maro can indeed to all intents and purposes be considered as identical.

This is important, because the rain-dependent ricefields east of Merauke have—under favourable weather conditions—yielded 2,200 lbs. of paddy per acre and more.

The problem of the suitability of the Merauke project has also been directly approached by sowing experimental rice plots in the area itself. The water supply in these trial plots was, of course, dependent on the rainfall.

The first trial was sown in January 1958, with three varieties. Although weather conditions were not ideal (insufficient rains during the vegetative stage), results were encouraging, at least with the variety Nickerie, which gave a yield of 2141 lbs. per acre.

In 1959 the experiment was repeated on a larger area (25 acres). As the rains came very late in this season, the sowing had to be postponed until March 1959. The variety used was Blue Bonnet.

While the heavy rains lasted, the irrigation water was kept flowing slowly so as to get rid of the excess of soluble salts.

The response of the rice crop was striking. The vegetative growth was excellent, the colour dark green (see photo). Unfortunately the rains stopped in the second half of April, when flowering had just commenced. Consequently, the field dried out and the crop failed ultimately. However, it is practically certain that if rainfall had continued a month longer, as in normal seasons, a good harvest would have been obtained.

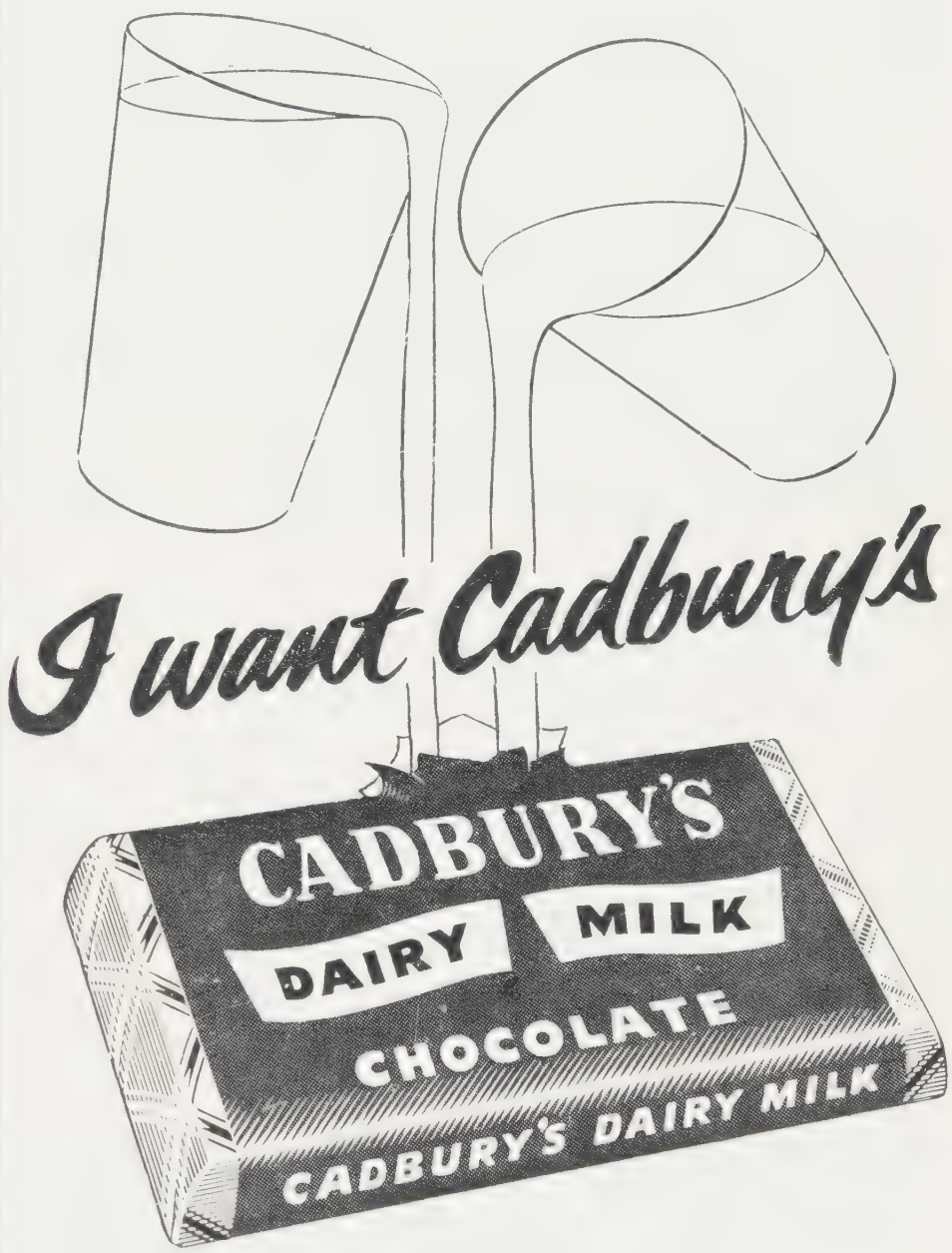
Obviously, controlled irrigation is the answer to the problem of successful rice growing on this type of soil, and it can be confidently expected that with adequate irrigation soil conditions will improve rapidly, and high yields can be expected within a few years.

The above-mentioned experimental plots were laid down on undisturbed soil. However, the greater part of the young marine clay area between the Maro and Koembe Rivers is covered with remnants of beds and ditches, which were established by the local population in the past. These beds were thrown up above wet season water level and used for various crops. However, when the population was decimated by diseases early this century, the beds were abandoned and are now covered with secondary forest.

The removal of the forest and the levelling of the ground implied some further investigations. Experimental clearing and levelling by mechanical means has already been tried out and proved to be quite feasible and not excessively expensive.

Furthermore, it appeared that within a year the topsoil of the beds that had been pushed into the ditches had sufficiently set to carry heavy machinery. Then some additional levelling had, of course, to be done.

A trial plot was sown in March 1959 on such a levelled area. As was to be expected, the first crop was irregular, growth being luxurious on the filled-up ditches and poor on the scraped-off beds (see photo). It remains to be seen how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long it will take before the soil has become sufficiently homogeneous to carry an even crop. This process, which is promoted by alternate cultivation, irrigation and drainage, will presumably take at least a couple of years.

Although some investigations are still in progress, it was considered that sufficient evidence had been gathered to come to a decision, whether or not to embark on the main project. This decision was positive and at present a definite plan is being worked out and steps taken to ensure the financing of a large, mechanized rice farm in the area concerned.

Mother-And-Child Welfare

(continued from page 46)

teachers or, where these are not available, pays a subsidy of £10 per child per annum on a daily average attendance basis towards the employment of supervisory staff.

Training of girls as pre-school assistants is also undertaken by the qualified staff at the centres at which they are engaged. The training course covers a period of three years. After graduation, the girls work for a year under supervision and are able then to accept full responsibility for village playgrounds.

All pre-school children receive regular medical inspections; a full medical examination is carried out annually.

Training of girls as midwifery and infant welfare assistants or orderlies is carried out by the Infant, Child and Maternal Health Service with the aid of the missions, which receive a subsidy for this work. In 1958-59, there were 11 Administration and 8 mission training centres in the territory from which 9 midwifery assistants, 29 infant welfare orderlies and 3 midwifery orderlies graduated. A further 113 students were in training at Administration centres and 89 at mission centres.

The initial training course covers a period of two years, at the end of which students are qualified as infant welfare assistants. A further year is required for midwifery assistants. The examination conducted by the Service at the conclusion of both courses consists of written, practical and oral work. On graduation, a certificate is issued and graduates then work in hospitals and clinics caring for mothers and infants. Infant welfare orderlies were trained to work under supervision and undergo oral and practical examinations only.

PICTURE CREDITS

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Above: A.M.O. Gideon Zoloveke addressing the villagers at Dukwasi after the members of the Dresser Training Course had been permitted to inspect their village. Dressers were taught not only how to inspect villages, but also how to discuss needed improvements with the people afterwards. Right: Dresser John Pitu from the Shortland Islands, making a note after inspecting a rain barrel for evidence of mosquito breeding.

Health Education Courses Held In Solomons

Two courses in health education were recently held in the British Solomon Islands, one for village dressers, the other for village teachers. The Commission's health education officer, Miss Leonie J. Martin, conducted both. She collaborated in preparing this account of them with the three Assistant Medical Officers who worked with her . . .

WILLIAM TAYLOR FAKAOMEA, JOHN NASOME, and GIDEON ZOLEVEKE*

LAST April the four authors of this article began working together, a partnership that was to last eight weeks. The Protectorate Government and the South Pacific Commission were combining forces to run two training courses in health education, the first for village dressers and the second for village teachers, from all districts of the Protectorate. The work was planned so that it might be possible for the Assistant Medical Officers to develop their health education teaching throughout the Protectorate.

* William Taylor Fakaomea, a Solomon Islander, works at Auki Hospital, Malaita. He attended the SPC-WHO Health Education Training Course in Nouméa in 1957. John Nasome, a Fijian, works in the Central District in the Solomons, while Gideon Zoleveke, from Choiseul in the Western Solomons, is on the staff of the Medical Department at Gizo.

Course For Village Dressers

We began our four-week Dresser Training Course on April 4. The Malaita Council gladly gave us accommodation at their headquarters at Aimela. The twenty-two dressers and medical assistants lived in the guest-house, while two smaller houses were provided, one for the Assistant Medical Officers and the other for Miss Martin.

We used the Council courthouse for our classroom, and shared the office facilities. This meant that staff and trainees could live and work together without the problem of too many outside interruptions, and it made possible a great deal of informal discussion and teaching, which was appreciated by the trainees. We were also fortunate in having with us for part of the time Miss Ola Reeve, who helped in the preparation of lecture notes and with some of our teaching aids.

The dressers came from all districts. We wanted to help them to revise their

Members of the Dressers Training Course with the staff (the authors of this article), photographed at Malaita Council headquarters at Aimela, where the Course was held.

At a closing ceremony, dressers received certificates from the District Commissioner, Mr. M. Townsend.

knowledge of sickness, and to add an appreciation of public health principles and the importance of health education. Some of the dressers had been working for up to twenty years, while others were relatively new. But all were enthusiastic and worked hard, even though some of the things were very hard to understand at first.

The Way We Worked

We would begin with a talk from one of us, and then for a while we would work in small groups so that everyone might have a chance to ask about things he wanted explained, or to tell what he did in his village. We had three groups, each with an A.M.O. as leader, while Miss Martin visited each in turn. Later the groups would meet, and one member from each would tell us what his group thought; or perhaps each group might make up a little story and act it for us.

In this way we could talk about the facts we had learnt; about the beliefs, customs and tabus in the villages and how these might make people think or behave; about the best ways for trying to explain about sickness to the people so that they would be able to understand. When people do not understand they are not very likely to do things that will help them to have better health.

In this way the dressers have learnt from their own experience that they will need to tell people things slowly and many times, and in words that are easy to understand. The Course has shown them that while it is good to listen, it is even better to "see" as well; and it is best of all if you can share in "doing".

We tried to share the "doing" in as many ways as we could. Everybody made teaching aids (posters and flannelgraphs mostly) to take back home. Everybody had an opportunity to "report" to the class, and to take part in plays. And during the four weeks we visited several nearby villages to take a look in real life at the problems we had been discussing in class.

In this way we learned what to look for, and how to make reports on what we saw, as well as trying to find ways to help the villagers to improve conditions.

The dressers themselves wrote a report about village cleanliness that was published in the April *Malaita Newsletter,* and another about village markets that was to be published in May.

Course For Village Teachers

The Teachers' Course was held in Honiara, at the British Solomons Training College. We had twenty-two teachers representing all districts, sent by Government Councils and the principal missions. We were very glad that the missions were able to share so fully in this Course. We also had eight students from the College, who with a member of the College staff as group leader, took part in the whole Course. Though it lasted only ten days, everyone worked hard and we managed to do a great deal.

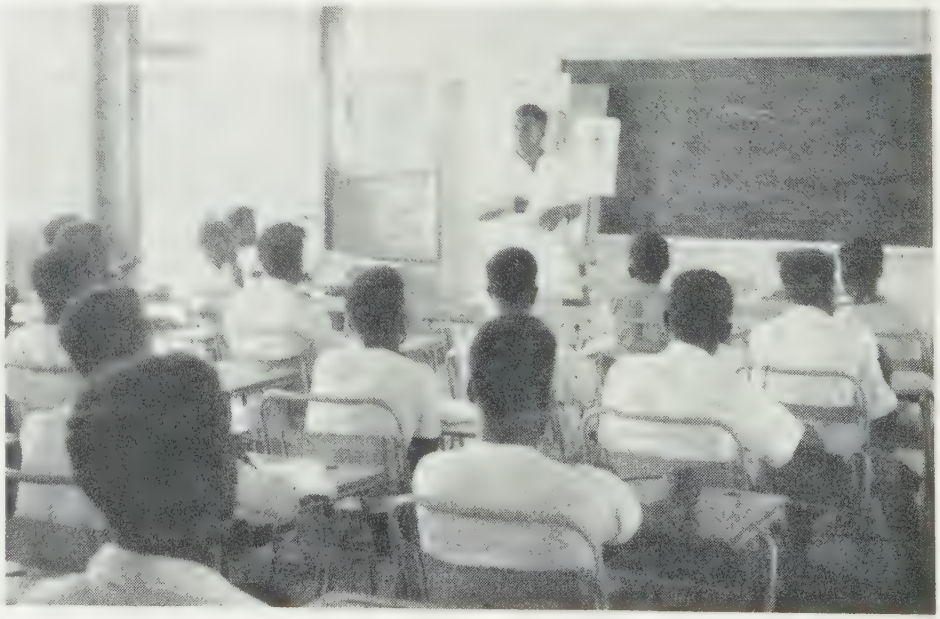
For the first week we had Dr. Norman-Taylor, the South Pacific Commission's public health officer, who outlined the responsibilities of teachers for ensuring and maintaining a healthy school environment and healthy children. Dr. Norman-Taylor took charge of our village excursion, and demonstrated the building of simple but adequate latrines.

For the rest, we tried to teach facts (this again being the job of the Assistant Medical Officers) which the teachers could pass on to their classes. We used group discussion of the problems, and we had plenty of "workshop" sessions for the making of teaching aids.

We tried in both Courses to emphasize the need for co-operation between dressers and teachers, so that health education can be spread as widely as possible and the people of the Solomons helped to understand more about sickness and health. It is only by the people themselves taking action that many improvements can be made, and better health enjoyed by everybody.

Presentation Of Certificates

On the afternoon of April 30, when the Dressers' Course ended, a ceremony was held at which the District Commissioner of Malaita, Mr. M. Townsend, presented dressers with Certificates of Attendance. Similarly, on May 20 His



A.M.O. John Nasome giving a lesson on hookworm to the village teachers who attended the Teachers' Training Course at Honiara.

Dr. W. Norman-Taylor, SPC Public Health Officer, conducting the village inspection that was arranged as part of the Teachers' Training Course.

Excellency Sir John Gutch, High Commissioner for the Western Pacific, presented teachers who had attended the Village Teachers' Course with their Certificates.

Both ceremonies were impressive, and the good wishes of those present were extended to both groups as they faced their new tasks and responsibilities. Theirs will not be an easy road, but they will have many friends to help them.

The Sandalwood Tree *(continued from page 39)*

The principal species which have been —and in some cases are still being— exploited in Oceania, are:

Species	Found In
Santalum austro-caledonicum Vieill.	New Caledonia and the New Hebrides
Santalum freycinetianum Guad.	Hawaii
Santalum insulare Bertero	French Polynesia
Santalum marchionense Skottsb.	Marquesas Islands
Santalum yasi Seem.	Fiji

It must be said that several of these species differ only slightly, as for example, *S. insulare* and *S. marchionense*. Actually, sandalwoods are plants of a very variable form within one species, and this may have resulted in some confusion in their botanical nomenclature.

In a few islands of the Pacific— notably Hawaii and New Caledonia—the Europeans have introduced the Indian species, *Santalum album* L.

Sandalwool trees are known in Oceania under the following names:

Amboina	AYASHU
New Hebrides	NASSAU, NEBISSI
Fiji	YASI
Tahiti	AHI
Marquesas	PUAHI
Hawaii	ILI AHI

Uses Of Sandalwood

In a few islands of Oceania, notably in Eastern Polynesia, the natives used the scented heart of the sandalwood to perfume the coconut oil they applied to their skin and hair.

It has already been mentioned that when sandalwood was first exploited in the Pacific, it was mostly sold on the Chinese market. Apart from burning it as incense in temples the Chinese used it in pulverised form as a base for perfume, in cabinet work, and for making a variety of articles such as fans.

Later on the Europeans began to use the wood in the manufacture of perfume and medicinal drugs. The output of essential oil, by distillation, varies between 1% and 6%. This oil contains sesquiterpenic compounds. In medicine, sandalwood was—and still is—employed as a stimulant and expectorant as well as an antiseptic for the urinary and respiratory tracts. Nowadays it is used mostly to make perfume.

Only the heart of the wood—particularly of the stump—is exported, for it contains the highest proportion of essential oil.

As an indication of the present economic importance of sandalwood, in 1959 New Caledonia exported 40 tons and the Condominium of the New Hebrides 65 tons, chiefly from Erromango Island.

The price offered today for sandalwood is attractive (25,000 francs CFP[1] per ton in April 1960 at Noumea).

Lessons Of The Past

As a result of the ruthless exploitation which took place in the last century, the resources of sandalwood stands still in existence in Oceania are limited.

The fate of sandalwood in Fiji has been mentioned; its fate in Hawaii is also worth recording. Sandalwood was first discovered in these islands at the end of the eighteenth century, and exploitation began around 1811. King Kamehameha I had a monopoly of this trade, and with a view to husbanding the precious resources of the Group, made sure that the stands were not destroyed. Unfortunately, after his death in 1819 this wise policy was abandoned, and then began the "rush for the spoils". Ten years later there was no more exploitable sandalwood in the Hawaiian Islands. (It is of interest to mention here the Hawaiian Chief, who, after the sandalwood resources of his own country were exhausted, learned of the existence of the valuable wood in the New Hebrides. He then set out to conquer Erromango, supposed to have the richest stands of sandalwood trees in the Group, with the intention of making himself Governor of the Island. However, this ambitious plan ended in failure, as the Chief's ship foundered on the way).

Only in comparatively recent years has it been realized that these trees need protection. In 1930 the Fijian Administration prohibited their exploitation, while the same decision was taken in the Loyalty Islands in the New Caledonian Group.

More recently, the exploitation of adult sandalwood trees was authorized in the Isle of Pines (in the same Group) only on the condition that 500 young seedlings be planted for each ton of wood exported.

Sandalwood trees can, in fact, be grown easily from seedlings, as has been proved by experiments in New Caledonia.

Regulations similar to those already mentioned—or subsidies for replanting— should be instituted in other islands where sandalwood trees grow, or have grown in the past. They are a substantial economic resource, and it would be deplorable if they were to become extinct.

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[1] 1 £Stg. = 249 francs CFP.

Joeli Kaumaitotoya, Fijian technician on the staff of the Fiji Broadcasting Commission, working on the wiring of a panel unit.

Training Broadcast Technicians In Fiji

The problem of selecting and training local personnel for highly technical duties is a common problem throughout the Pacific. How it is overcome by the Fiji broadcasting service is described below.

By T. C. AGAR*

A CALL for office staff usually taps an existing reservoir of trained people, but when staff is required for exacting technical work the search is much more difficult.

In the Fiji Broadcasting Commission, trained personnel from abroad are normally engaged in the early stages of any new activity, but because the time must come when the organization has to stand on its own feet, careful training of local personnel has to be undertaken.

The answer to the question—"What is required of a radio broadcasting technician?"—is a complex one.

One of his important tasks is to play disc and tape recordings during the daily programme. From the listener's point of view this is his most important duty, yet for the technician, it is more operational than technical.

In the more difficult technical field he is expected to become an expert, with the ability to service extremely complicated and high-quality control mechanisms, and expensive high - power transmitters. He must become adept at designing and installing large aerial arrays.

It has recently been stated that regardless of nationality, all men have much the same ability to undertake difficult tasks. The Fiji Broadcasting Commission had this thought in mind when it instituted its technical staff-training programme.

In Fiji there are Fijian boys, and as well, Indians, Chinese, and part European lads. The F.B.C. has found that these local boys, holding a School Certificate but with no previous radio background, can become capable panel operators within two months.

The technical trainee, or junior technician, spends his first two years becoming an efficient operator. In his first week he simply watches and endeavours to adjust himself to his new and (frequently) exciting environment. Supervised by the senior technician in charge of his section, he is then regularly rehearsed in the technique of presenting a broadcast programme, working in close co-operation with the announcer. This phase of his training may last several weeks until he is given a chance to control a live daytime programme, when fewer difficulties are likely to be encountered and while several senior men are at hand. A lad remains under supervision until he is able and fully competent to cope with the sudden difficulties that might require an immediate decision. These crop up almost every day.

The purely technical side of the training is not so simple. To take a young man with absolutely no background and train him in the theory and practice of radio, and eventually make him into an experienced expert, presents considerable difficulties. Lengthy training, and much intensive study, are essential.

Realising this, the F.B.C. arranged correspondence courses for its staff to begin with, and then procured a number of kitset units for assembly into test instruments. Trainees were most enthusiastic about constructing this equipment, and with adequate supervision have achieved professional results.

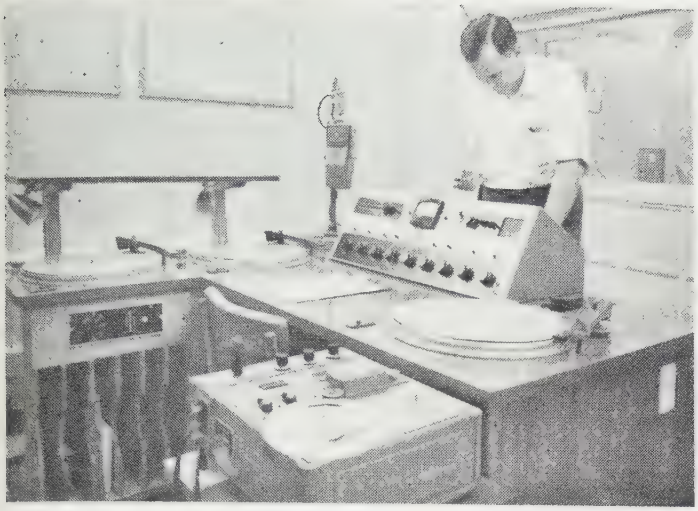
A most valuable consequence of this plan has been that the trainee really understands his equipment. He has learnt how it operates and naturally takes considerable pride in his achievement. Incidentally, in the process the station has acquired some low-cost high-grade auxiliary test gear.

The need for training to F.B.C. standards applies not only to trainees but also to senior men with a good radio background but with no experience in the techniques peculiar to radio broadcasting.

A Successful Experiment

An experiment of considerable magnitude was recently carried out in the Commission's Suva studios with the complete construction of technical equipment for a control room and an announcers' suite. This project enabled the technical staff to become thoroughly

* Chief Engineer, Fiji Broadcasting Commission.



Above: The English-language programme suite, showing the turntables and F.B.C.-designed and constructed consolette. Mr. Keith Broadbridge, one of the F.B.C. senior technicians who installed the equipment, is working on the consolette. Right: The newly-completed recording studio. Mr. Ivan Gibson of the F.B.C. technical staff is recording a programme.

familiar with the intricate wiring of a broadcasting studio and the technical requirements from, literally, the ground upwards. The metal and paint work were done by local firms, and then senior-grade technicians, with the enthusiastic trainees assisting, completed an extremely efficient unit in only nine months. Extra capital outlay was nil, as the actual cost came within the annual budget, but the valuable practical feature of this project was the gain in staff training.

Eighteen months later an even more ambitious construction job was undertaken. All the equipment for a comprehensive recording studio was built and installed by staff direction and labour.

One of the two senior technicians who worked on this project was a full Fijian. He proved that men of his race could quickly and skilfully face up to difficult technological problems, the main additional requirement being adequate supervision.

The wiring techniques called for circuit board construction not unlike the modern printed circuit, and this enabled the local technicians to become familiar with the latest overseas methods.

The successful completion of major tasks like this has resulted in a technical staff which has considerable pride of achievement, and the confidence to tackle and solve any technical problem associated with broadcasting in Fiji.

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A medical assistant giving an injection for yaws. Baliem, Netherlands New Guinea. The WHO mass campaign in the South Pacific against yaws has been highly successful, and today the disease is rare in the region.

The Advance Of Public Health

According to the author, public health is today emerging from the preventive era, and must now enter into the field of positive social service.

By W. NORMAN-TAYLOR*

MOST of us know the elementary rules that will keep our bodies healthy; we keep ourselves clean, we eat a varied diet, we take exercise and sufficient rest. All this is part of our normal way of life. And we know very well that if we lose our health we not only lose the capacity to enjoy life but we may also lose the capacity to do the necessary work which, by giving us food or money, enables us to live at all. A sick man is not only unhappy, he is poor, and, in the absence of a benevolent social security system, he will become poorer.

A community is no more than the sum total of all the individual people in it, and the health of a community is simply the sum total of the health of the people. If the community is healthy it will be rich and contented; if it is unhealthy it will be poor and miserable. Where there is much sickness we find that there is a low overall productivity, since men weakened by ill-health cannot work hard. So there is a low cash income, and small sources of revenue, with the result that the community is unable to afford the basic public services which might improve its health. The people are not able to afford a balanced diet and this in turn keeps their health low and gives them a poor resistance to disease. Thus a vicious circle is set up: ill-health, low productivity, low income, poor public services, malnutrition. The sick farmer cannot grow enough food—the malnourished farmer gets sick.

It is important to recognise that public health and economic and social development are inextricably bound up with one another. If one aspect lags behind, they all lag. It is clear that economic development is impossible without health and strength, social development is impossible without money, and, without money, public health is impossible.

Public Health Practice

Just as private medical practitioners deal with individual persons, so the public health officer deals with the public as a whole. The community as such is his patient. His duty is to keep the community healthy, or to restore it to good health if it is below the normal standard. His duty is to break that vicious circle or to prevent it from ever starting.

In tropical countries the public health authorities have been faced with a difficult problem. The climate has often favoured the growth of insect carriers and various parasites, and the low level of education and living standards have made the practice of hygiene difficult to apply.

In the Pacific we have been more fortunate than elsewhere. Yellow fever and plague do not occur in this part of the world, while smallpox and typhus have been very rare visitors. On the other hand, the geographical conditions which have isolated us from these diseases in the past have left us with little or no resistance to diseases such as measles or whooping cough, which have accordingly caused havoc in the Pacific from time to time.

The main scourges have been—and still are in some parts—malaria, hookworm, tuberculosis, leprosy, yaws, filariasis and dysentery.

Eliminating Disease

In attempting to break the vicious circle the first duty of a public health service is to apply such sanitary measures as would prevent the introduction of the more serious pestilences. Thus have come about the introduction of quarantine measures, compulsory vaccination and disinsectisation of aircraft. The South Pacific Commission itself took active steps to assist these measures in the early years.

The second step is to tackle the diseases that are already in the countries, the endemic diseases as they are called. Leprosy was dealt with by well-tried methods, the isolation of the patients in special residential hospitals. Here we owe a great debt to the various missions, which, thanks to the Biblical connexions with this disease, have undertaken much of this work. In recent years the introduction of modern drugs has made treatment more effective, and has greatly shortened the length of time necessary to spend in isolation.

HOOKWORM is a disease that would have seemed easy to get rid of. It is caught by walking barefoot on ground fouled by human excrement. If everyone could be persuaded to use a latrine the disease would disappear. The Rockefeller Foundation, between the World Wars, gave much financial assistance to governments to help in campaigns to provide latrines, but, as is so often the case, apparently simple solutions met with unexpected difficulties. Today the hookworm situation is almost as bad as it ever was. By causing tropical anaemia, with its weakening effect on health, hookworm is undoubtedly responsible for the low level of production in many areas.

DYSENTERY, together with typhoid and infantile gastro-enteritis—the great killer of babies—are also excremental in origin, and would have been reduced by the same sanitary measures as are applicable to hookworm.

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* Dr. Norman-Taylor is Public Health Officer, South Pacific Commission.

MALARIA is the great scourge of Melanesia. Polynesia is free of it, thanks to the peculiar breeding habits of the anopheles, the species of mosquito that carries malaria. In Melanesia, malaria is almost universal; it kills off a large proportion of babies and leaves many of the adults so weak that productive labour is impossible. Only in recent years have effective methods of dealing with malaria been found, and now at last there is some hope of getting the situation under control.

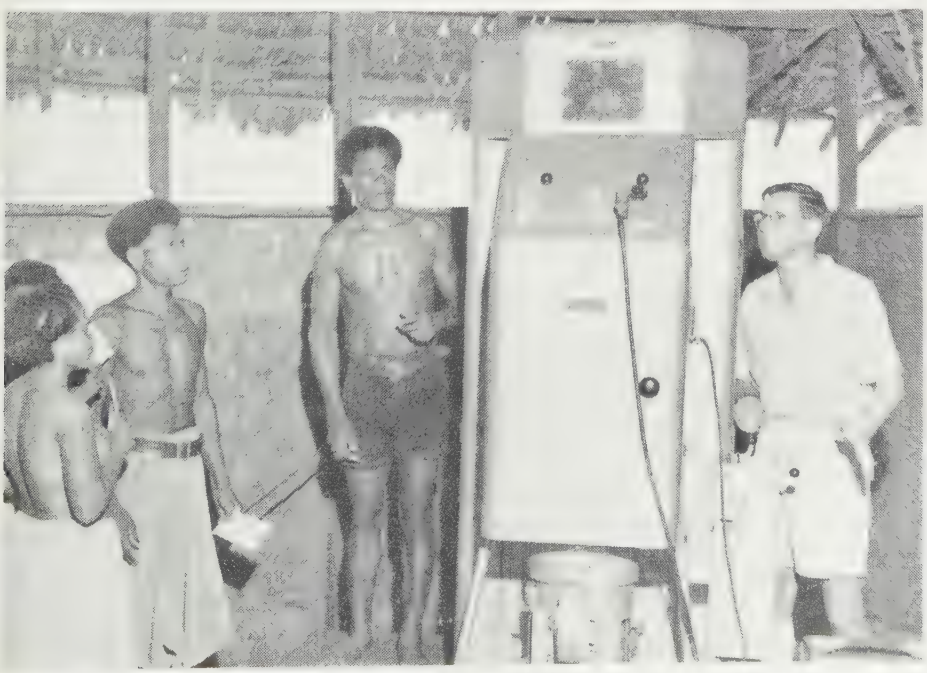
Much of the anti-malarial work in the Pacific is being conducted with the help of the World Health Organization, which is able to bring its great experience to bear on the local problems.

Another field in which WHO has been of great help has been in the elimination of YAWS. Yaws is something like syphilis, except that it affects the skin and is caught by ordinary contagion, not by sexual intercourse. Its devastating effects on health are the same, however. Fortunately it is nowadays easily cured, and this has resulted in remarkable successes when mass treatment campaigns are undertaken. Today yaws is a rare disease throughout the Pacific.

A nurse administering tablets to children during an anti-malarial campaign in Netherlands New Guinea.

TUBERCULOSIS is one of the more serious afflictions in the Pacific region today. Most governments now have special case-finding teams who travel from village to village, giving every inhabitant an X-ray or a skin test in order to discover persons in need of isolation or treatment. Here again modern drugs have made the outlook much more favourable, and have reduced the need for prolonged stay in hospital.

FILARIASIS, in the form of elephantiasis, has afflicted the islands from time immemorial. These unsightly deformities were remarked on by the earliest of the European travellers. The condition is due to a microscopic worm in the blood and is carried by mosquitoes. In Melanesia it is the night-biting anopheles, the same one that carries malaria, but in Polynesia it is chiefly the day-biting *Aedes*. This particular mosquito likes to breed in domestic water containers, and any old rubbish that holds water near a dwelling house. Thorough attention to domestic sanitation appears to be the only method of improving matters, but results have often been disappointing.



This portable x-ray unit has been in constant use in Papua and New Guinea since 1952, for mass anti-tuberculosis surveys of the population.

Child Welfare

So far we have listed only distinct diseases, caused by germs, where the method of prevention has simply been either to cure the people who harbour germs or to interrupt the process by which the germs are spread. But there is another great cause of death in most backward communities — namely, the holocaust that occurs among infants and toddlers — the "slaughter of the innocents" as it has been called, or, in more scientific language, "infantile mortality".

In some backward communities a quarter—or even a half—of all children born, die before they reach their first birthday. The cause, in nine cases out of ten, is simply ignorance of mothercraft. That the condition is almost entirely preventible can be shown by the fact that in most European countries, thanks to their mother and child welfare services, only about 2 or 3 per cent of babies die in their first year. As a preventible condition, one where preventive methods are to be applied on a community-wide scale, it is naturally one of the most important fields of public health activity. In most territories today—but unfortunately not yet all—there is a well-organized service taking care of this side of things.

Requirements For Success

The rate at which these public health campaigns are being applied and are achieving success naturally varies greatly

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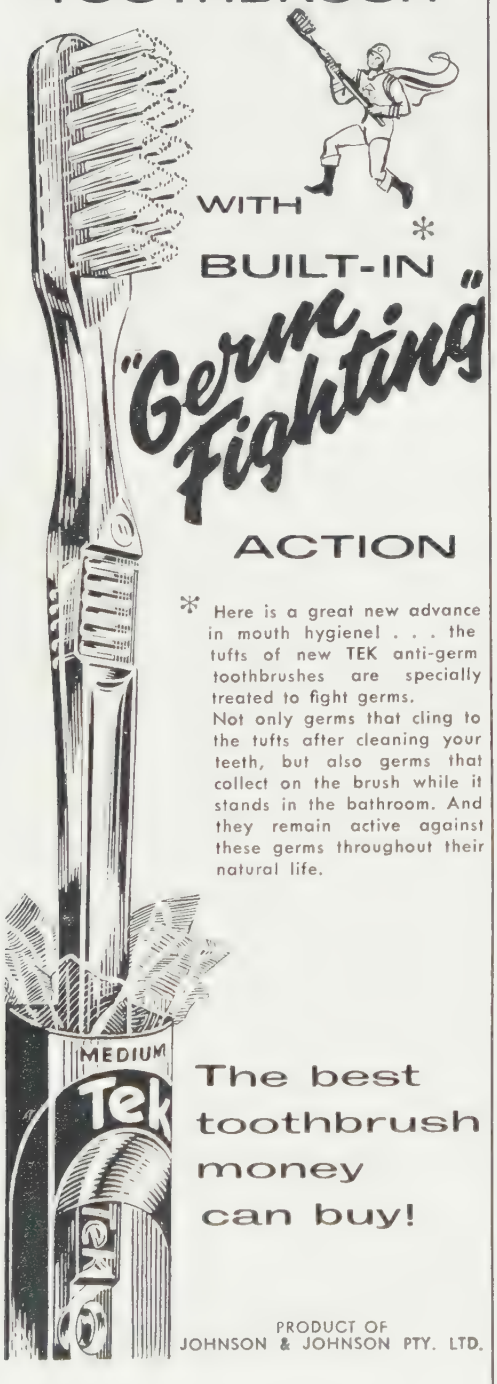
ANTI-GERM
TOOTHBRUSH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with the level of development of the country and the financial and expert resources available. Some Pacific territories have reached the stage where the need for these mass drives is over and the authorities need to maintain merely a watching service. On the other hand, there are some territories where yaws control, for example, has been the only campaign attempted so far. To conduct the campaigns, specialist medical officers and specially-trained teams of auxiliary health workers are needed. Such campaigns are therefore often very expensive in terms of staff and equipment, but it is realized that little or no progress can be made until these endemic scourges are brought under control.

For permanent success it is necessary to build up some sort of rural health service by which trained health workers are stationed out in the villages, providing everyday medical care, ever on the alert for these serious diseases and constantly maintaining the necessary standards. Clearly there are not enough doctors or senior health inspectors to cover the whole ground, nor could they be afforded. Partially-trained auxiliaries have to take their place, and so we find medical assistants, health inspector assistants, and midwifery assistants, working out in the field. They are often lonely and far from advice and support, but they battle on bravely in the cause of health. These workers have to have a long course of special training and this, too, is an important part of the public health department's work.

Equally essential is to obtain the full co-operation of the people. It was the failure to do this that brought the old hookworm campaigns to naught. No public health measure will achieve *lasting* success unless the people themselves feel the need for it and actively support it, not in a burst of enthusiasm but as a permanent part of their way of life. Health education should thus form an integral part of any public health service.

One point at which health education can be applied is through the schools, and health science is now usually included in most of the teacher training courses. Teachers often have a great influence in the community, not only among the school children.

Another place where health education is well received and digested is in the women's clubs, as women often have a far more realistic attitude to health than have their menfolk. In both these fields—health education and women's interests—the South Pacific Commission is giving active help to territories that ask for it.

The Third Stage—Positive Health

We now come to the third stage of public health, the stage of social welfare. The public health that we have described so far has been a negative approach, *preventing* something. Now we move on to the more positive approach, the object being to take care of and improve people's health.

Under this heading we can think of such things as the child welfare services which, although preventing infantile mortality as already mentioned, also have the object of helping mothers to rear healthier families. Then there is the school health service which seeks to build up healthier and happier citizens of the future. In some territories factories and plantations are obliged by law to provide medical care for their workers. Public health authorities may undertake the "rehabilitation" of the disabled, for example, the blind or crippled may be taught useful trades. There may be pensions for the blind, too, and for the aged or widowed, and compensation for disabled workers. There may be schemes to take care of unwanted or orphaned children.

The provision of decent housing must be placed high on the list of the needs in a developing community, not only to preserve family life and to provide the proper surroundings for rearing healthy children, but also as one of the means of stamping out tuberculosis and infantile mortality.

Mention might also be made of mental health. Doctors have been so busy in under-developed countries, dealing with diseases of the body, that they have sometimes forgotten the mind and its care. In European countries, where communal diseases are on the decline, mental health, in the words of the previous Director General of WHO, is the great public health problem of the second half of the twentieth century. As civilization brings its doubtful blessings, so it also brings its worries, engendered by the break-up of the old way of life and the uncertainty of the future. This is the field where mental ill-health may take root if not carefully watched.

Good nutrition is naturally essential for health, and the public health authorities always try to work with the agricultural authorities to see that not only is nutritious food grown but that it is available at a reasonable price in the markets. This can only happen if health education has brought about a "consumer demand" for these things.

So we see that public health is emerging from the preventive era, and must now enter into the field of positive social service. Economic development and public health from henceforth go hand in hand, equally dependent on—and equally essential for—social progress and the full enjoyment of life.

New X-ray Equipment For Cooks

Extremely lightweight X-ray equipment which can easily be carried over coral reefs by two or three men has been bought by the Department of Island Territories, New Zealand. It will be used in the campaign against tuberculosis in the Cook Islands, where the incidence of this disease has been fairly high. Mass X-ray surveys are now made throughout the fifteen islands of the Group.

New Zealand's Tropical Provinces

THE "provinces" dealt with in this booklet are the scattered and lively Cook Islands, rocky and hurricane-battered Niue, and the remote and lovely atolls of the Tokelau Group. All are within the tropic latitudes of the Pacific, and are nearer to the equator than to Auckland, yet constitutionally they are "within the boundaries of New Zealand".

In these sunny Island "provinces", 24,200 people inhabit a total of 194 square miles of land, but great reaches of ocean fragment them into 14 separate small communities. Each must be provided, as far as humanly possible, with government, education and health services, communications and transport, and as much economic prosperity as the people and the land can support.

A Fast-Changing Scene

As everywhere else in the Pacific, the scene is a fast-changing one; the problems of yesterday are not those of today. In these relatively small islands, health and education are now established to the extent that rapidly-increasing populations pose their own problems. Half the total numbers are still at school or too young to attend. Tastes have become sophisticated, and thus expensive. But the small land areas and their remote situations remain unmoved.

Fortunately, political and public opinion in New Zealand accepts readily today's world pattern for such situations. With a background in which New Zealand's Maori people number 1 in 15 of the metropolitan population, there is willing and liberal assistance to their Island cousins in maintaining their systems of administration, welfare services, and economic facilities. Without them, prosperity and happiness, as measured by today's desires, would not be attainable.

Financial help from New Zealand for these Islands in the 1958-59 year was £536,942, compared with £592,917 of revenue produced within the Islands themselves.

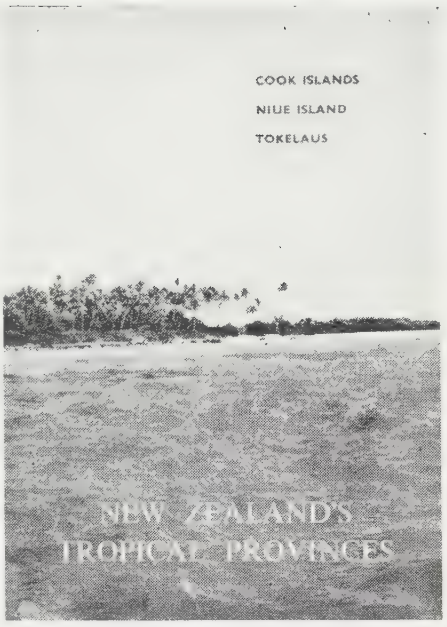
Incentive to increasing self-help, rather than easy acceptance of generosity, is encouraged by the establishment for the Cook Islands of a legislature which has a majority of elected members and authority to expend those revenues which the Islands themselves provide. Again in the modern pattern, educational services and training are enabling Islanders increasingly to handle their own affairs.

The booklet reports an interesting incidental development: "The current of Polynesian migration southward is today flowing again as strongly and steadily as it was 500 years ago". Thus is recorded the fact that 14 per cent of the Cook Islanders now live in New Zealand, and most of them have made this change within the past 15 years. It is a movement not without some problems, but they are not serious enough to alter the basic situation that these Islands and their people are part of New Zealand.

New Zealand's Tropical Provinces is a booklet of ready information and reference, more readable than the official annual reports and—with its many illustrations—much more graphic, and not without humour. One of its illustrations depicts "Four features of Cook Islands life". In one picture there are the village church; its roof providing the village water supply; two youngsters in the foreground demonstrating the "simplicity" of out-of-school wear; and a small belly distended by too much of the same kind of food.

The volume is clearly a product of official sources; it is equally clear that the officials at the source are kindly human people with a sincere affection for the Islanders among whom their work has been happily cast.

—C.G.R.McK.



New Zealand's Tropical Provinces. A publication of the Publicity Division, Tourist and Publicity Department, Wellington. 1960. 48 pp. Illustrated.

PACIFIC VIEWPOINT – A New Journal On Pacific And Asian Developments

Bearing a strong family resemblance to the successful and widely-read *New Zealand Geographer**, now in its sixteenth year of publication, a new periodical on Pacific and Asian studies has recently appeared. Entitled *Pacific Viewpoint,* this new journal is to be published twice yearly by the Geography Department, Victoria University of Wellington.

The first number, which sets a very high standard in content and presentation, gives a promising demonstration of the Editorial Board's ability to provide authoritative articles and reviews of wide reader appeal. As stated in the Foreword, an important objective of *Pacific Viewpoint's* editorial policy is to be the development of a forum in which specialists in the social and natural sciences, both within the universities and outside these institutions, will find opportunity to widen the general understanding of the Pacific region.

The first issue features articles on a balanced and stimulating selection of topics generally emphasising the nature and pace of change in the Asian-Pacific world.

In an article discussing the role of plant introduction in the tropical Pacific, Dr. Jacques Barrau, Executive Officer for Economic Development, South Pacific Commission, takes his survey back to pre-European times as a background to a more detailed discussion of the plant introduction activities of more recent years under the stimulus of marketing opportunities.

Expressing his personal views on recent achievements on the Chinese mainland in an article entitled "The Changing Face of Rural China", Professor Keith Buchanan is certain to arouse considerable interest—and possibly some apprehension—among readers in a region where economic and social development proceeds with less dramatic impact.

Of particular interest to Pacific agriculturists and administration officers is an article by Dr. R. F. Watters on the nature and limitations of shifting cultivation.

In an article dealing with changes in the political geography of South East Asia, Mr. T. G. McGee gives an historical review of the past 150 years, and analyses the effects of former colonial regimes on the local movements for independence.

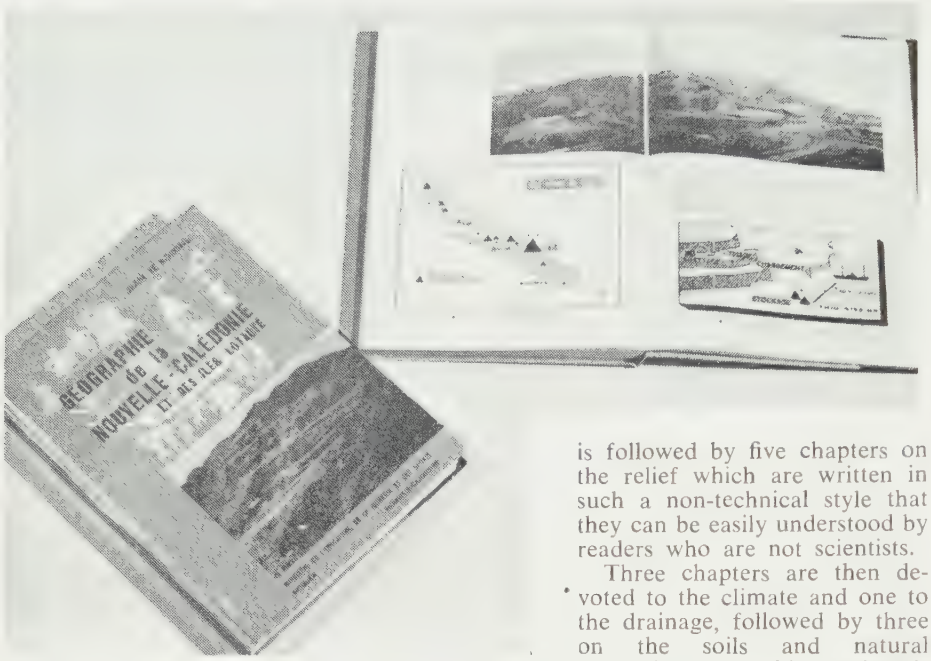
A section entitled "The Asian and Pacific Scene" presents a series of short papers of a diverse character including several of topical interest such as "Post-War Migration to Australia"—E. J. Donath; "The Maori in Town and Country"—J. Booth; "Cargo Cults and Social Change in Melanesia"—R. F. Watters. A selection of reviews of recent books and publications provides a useful concluding section in the first number of this dynamic publication.

—V.D.S.

* The *New Zealand Geographer* is published twice yearly by the New Zealand Geographical Society (Incorp.)—Editorial Office: Auckland University College.

Geography Of New Caledonia And The Loyalty Islands

A review by
JOHN WESLEY COULTER*



M. LE BORGNE has brought great credit to himself, La Pérouse College and New Caledonia by the compilation and publication of this excellent volume. Few books in Geography have such a wealth of pictures, maps, sketches, diagrams and tables. The author fulfils in an artistic fashion as well as in a practical and literary way his objective "of making New Caledonia better known" to the world.

The book is divided into three sections—the physical environment, the inhabitants, and economic life.

The Physical Environment

In the first chapter the author sketches the position of New Caledonia in the Pacific, pointing out its isolation. This is followed by five chapters on the relief which are written in such a non-technical style that they can be easily understood by readers who are not scientists.

Three chapters are then devoted to the climate and one to the drainage, followed by three on the soils and natural vegetation, and this section is concluded with one on the fauna.

The Inhabitants

In the second part of the book the first three chapters, discussing the indigenous population, include maps showing the distribution of the reserves and the density and distribution of the natives. The construction of houses, crops and methods of agriculture are treated in detail.

The last part of Section II, describing the discovery of New Caledonia, includes a sketch of the itinerary of Captain Cook and a map of d'Entrecasteaux.

Economic Life

Part Three of the book discusses how people in New Caledonia earn a living. The reviewer would have expected mining and metallurgy to come first since they are by far the more important, but to discuss agriculture first, as the author has done, is the conventional way.

The chapters on mining and metallurgy give the reader an excellent impression of the problems which confront these industries. The mineral riches of the island are brought out in a black and white map. The pictures of the mechanization of work in the mines shows how machinery has supplanted manual labour.

The last three chapters deal with interior communications, exterior communications, and foreign trade and commerce. The exports of the territory—matte, ferro-nickel, and raw ore, copra, coffee, trochus and skins—are given with a map of the world showing the principal customers. The diagram of imports shows a great dependence on imported foods, and a table illustrates the balance of trade.

In this very attractive volume there are 44 maps, 169 photographs, 82 graphs, 25 diagrams, 17 sketches and 28 tables, and a selected list of references at the end.

Géographie de la Nouvelle-Calédonie et des îles Loyauté by Jean le Borgne. Protat Frères, Macon, Saône-et-Loire, France. 1959. 309 pages.

* Professor of Geography, University of Cincinnati.

Fiji Women Enthusiastic About Club Work

(continued from page 55)

while at Government House Lady Maddocks entertained the group to tea and took them for a tour of the lovely grounds, the compost pit and the vegetable garden.

Early in September there are to be three parallel residential courses on sewing, cooking and gardening, with handcraft thrown in. Later on there is to be a Health Course on simple Hygiene planned with the Medical Department.

It is easier to arouse enthusiasm than to maintain a lively programme. Everything depends on the continued service of voluntary leaders and the steady supply of teaching material coupled with regular training courses.

A Newsletter is being launched full of the latest club events and developments as well as Household Hints and general information to women in Fiji; in these scattered centres it is important to maintain a link.

The Women's Interests Office in Suva —one single room—is increasingly a resort for women's activities. While the two Officers wrestle with programme, speakers and syllabus for the next course, answer innumerable letters, give flannelgraph demonstrations to various agricultural or medical extension workers, and cope with the creative side of community education techniques, the Fijian assistant deals with club leaders eager for help with handwork or patchwork or cooking recipes; paper for pattern-cutting is spread under one's feet and visitors trip over scissors and paraphernalia as they come in to discuss a club programme for a distant island or to ask for games and song sheets or some such essential kit for keeping members alert. The blackboard is covered with Fijian versions of simple songs on Food Values and other such; a student typist struggles gamely through the ever accumulating teaching notes and the telephone rings constantly.

An interesting feature of the work is the eager response to simple visual aids, especially the flannelgraph, which builds up a human interest through its readily movable personalities and brings an unexpected enlightenment to women who are quick to respond to a practical demonstration such as cooking or handcraft, but who submit apprehensively to what they feel is going to be an academic lecture on Women's Responsibility in the Community. The life story told by flannelgraph of the Fijian housewife Lavinia, her daily difficulties, her introduction to the ever-expanding club programme, her realisation of new potentialities—this mirror to village existence stirs the imagination and awakens the springs of action.

Much remains to be done, but in town and village, through schools and colleges, there is an increasing awareness of all that might be achieved by women taking their share in the exciting new developments that are a feature of Fijian life today.

(continued from page 30)

certain types of light-traps could be used against pests of nocturnal habit, for which really satisfactory measures of control are not known. The so-called "black light" is very attractive to many species of insects.

Biological Control

Control of pests by the introduction of parasites or predators is the ideal method of control where it can be made to work, because the initial cost is the last, and control is permanent, without further effort or cost. Disease organisms also are used, but these appear to involve continuing effort. Some are sprayed on plants as a "living insecticide", and others need to be continually propagated and distributed in the field.

It is of interest that some of the research workers employed by the South Pacific Commission are of the opinion that diseases are the most important controlling agents of rhinoceros beetles in Africa. However, there is as yet no practical method of making use of these diseases in the South Pacific area, though there are indigenous diseases which play their part here.

Many great successes have been achieved by the introduction of parasites and predators to Pacific islands. Hawaii has an outstanding record in this field, and Fiji has achieved some spectacular results.

Small oceanic islands in the tropics are particularly suited to this form of control, because of their favourable climate and restricted fauna. Of course, many attempts at biological control of pests have failed, but a very small percentage of successes is sufficient to cover the cost of the failures and return a handsome dividend. For instance, it is probably true to say that the biological control of *Levuana* moth in Fiji has paid for all the entomological work which has been done since and which will be done in the future.

Both Hawaii and Fiji continue to devote considerable effort to this method of control, and year by year there is a steady addition to the beneficial insects which are established in these islands.

Plant Quarantine

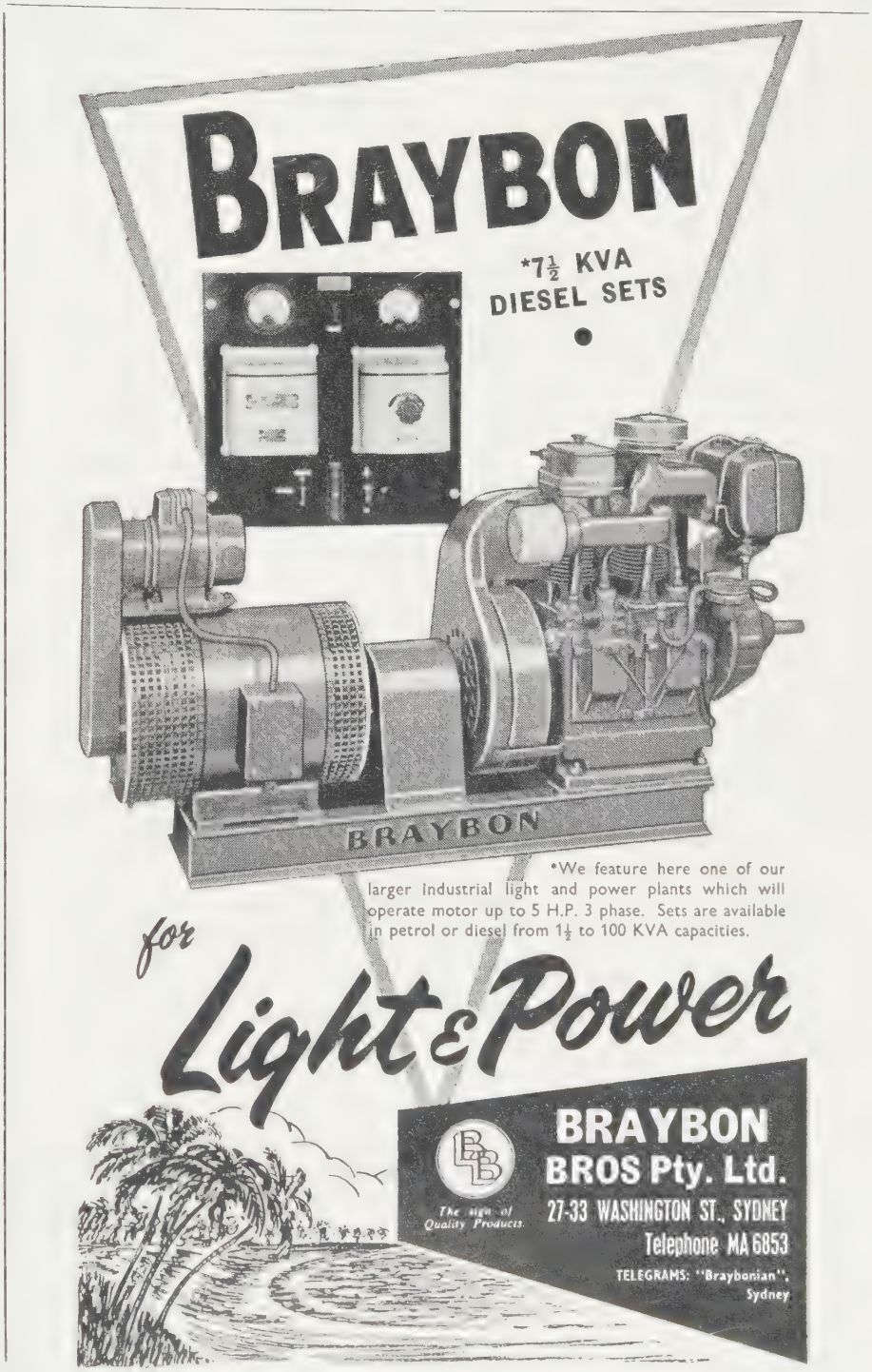
Quarantine regulations are a nuisance to many people, such as travellers, importers, exporters and aircraft and shipping companies. Certainly there are various forms to be filled in and inspections which must be endured, while freedom to move plant material from one country to another, or even from place to place within a country, is subject to many limitations. Permits must be obtained, certificates provided and treatments carried out, and undoubtedly the procedure is irksome.

However, the importance of plant quarantine laws and their enforcement is very great, especially in these days of rapid travel. Victims of quarantine procedure should realise that existing regulations are a compromise between the acceptance of foolish risks by plant quarantine authorities and the imposition of intolerable restrictions on trade and travel.

It must be remembered that the South Pacific islands are free from many dangerous pests and diseases which exist elsewhere. The introduction of such pests and diseases would cause heavy economic losses. Hence it is simple prudence to adopt quarantine procedures which give reasonable protection without causing any undue dislocation of travel or trade.

Conclusion

There is no doubt that control measures against insect pests of crops in the South Pacific area are largely neglected or poorly executed by growers. If the standard of living of the inhabitants is to rise, more efficient agricultural methods will become necessary, and, among these, control measures for insect pests are important. One has only to consider such pests as sweet potato weevil, banana weevil borer, corn earworm and taro leafhopper to realize what a large gap exists between knowledge and practice in the field of pest control.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PACIFIC READING

Material in this section is contributed by the South Pacific Commission Literature Bureau. Any enquiries relating thereto should be directed to Box 5254, G.P.O., Sydney, Australia.

Notes and News

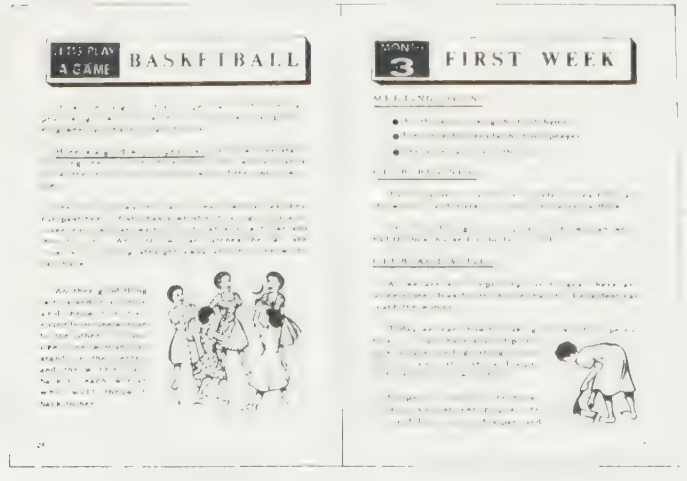
Literature Bureau Publications

Women's Clubs Booklets. The first of a series of four books, entitled *Things To Do In Women's Clubs,* has just been produced in co-operation with, and on behalf of, the Department of Native Affairs, Port Moresby. These new books are intended as a follow-on to the earlier Departmental publication *The Women Of Mamayang* to provide club leaders with a ready-made plan of activities for a twelve months period. Each of the four books covers a three-month period of the year, and deals with such matters as correct club procedures, things to make and do, games to play, and other activities so essential to any well-run club.

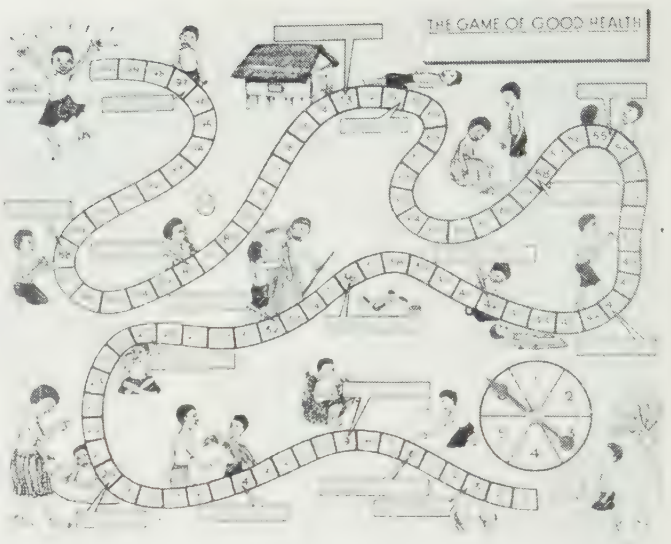
The material is presented in the form of a series of weekly club meetings, thus simplifying the task of the leader who, in the past, has often had great difficulty in organizing and preparing material to maintain the interest of club members. It is not intended that the plan presented in these books should be slavishly copied by club leaders, but rather that the material should be considered as providing basic ideas which can be adapted as necessary to suit local conditions.

The texts were written by the Department's Women Welfare Officers, whilst the Bureau arranged production details. Book I contains 40 pages, and is attractively printed in two colours—black and green. The text was set up on the Bureau's electric typewriter and is illustrated with 32 line drawings. It was printed on the kind of plant installed in the Commission's Literature Production Training Centre in Honiara. Two typical pages from this book are shown in the illustrations below.

Although these books have been produced primarily for Melanesian areas, we feel sure that Club leaders and organizers in other parts of the Pacific where women's clubs are being fostered will find them a valuable guide. Specimen copies of Book I, with details of production costs, are now available from the Literature Bureau, Box 5254, G.P.O., Sydney, Australia. Enquiries from territorial administrations or missions interested in the production of similar types of booklets will also be welcomed by the Bureau.



Typical pages from Book I—"Things To Do In Women's Clubs."



"The Game Of Good Health"—a simple but effective way of teaching the basic rules of good health at village level.

The Game of Good Health. Illustrated above is a simple but effective method of teaching the basic rules of good health at village level. Attractively printed in four colours—yellow, blue, brown and black—this game was prepared by the Department of Native Affairs, Port Moresby, and produced by the Literature Bureau.

Flannelgraphs for Fiji. The Bureau has recently completed the printing of six sets of flannelgraphs for Miss Marjorie Stewart, the Commission's Women's Interests Officer, who is at present working in Fiji. These flannelgraphs were prepared by Miss Stewart's organization for use by people working with women's groups, mainly—but not exclusively—at village level.

As readers will know, the business of producing a flannelgraph can be complicated and expensive if one is not careful. Miss Stewart uses a technique which simplifies the work and reduces costs greatly. The necessary figures for the flannelgraph are printed in black and white outline only, on moderately thin paper, about 13″ x 10″. When the figures have been printed, the pieces of paper are coloured by hand, stuck on to flannel, and cut out, as and when required.

All parts of the work except actual printing can thus be carried out by the women's groups themselves, who not only enjoy doing it, but are enabled to feel that they are really contributing something themselves to their own programme of work.

As an example of how costs can be minimized, in the present case, 500 copies of each of the six different flannelgraphs were printed for a total cost of only £A.15.

New Books For The Pacific

Geographie de la Nouvelle-Caledonie et des Iles Loyaute. Jean le Borgne. Nouméa: Ministry of Education. pp. 308. Price 250 francs C.F.P. (£stg.1).

This Geography of New Caledonia is a magnificent production, and I strongly urge every Education Department in the Pacific to examine it.* It has at least three points of

* Departments of Education and teachers in Pacific territories may obtain copies from the Ministry of Education, Nouméa, New Caledonia.

particular interest to all educationists, namely, its content, its arrangement and style, and its method.

As regards content, it is extremely comprehensive, covering physical geography (relief, soil, climate, vegetation, etc.); human geography (population, cultures, history, etc.); and economic geography, including a description of the economic resources and life of the territory. There are literally hundreds of photographs, diagrams, and maps.

In his introduction the author (who is Teacher of Geography at the La Pérouse College in Nouméa) puts his finger on a problem encountered in all small territories. The chief difficulty, he says, is to prepare a single work which covers the ground in a manner suitable for children of several different ages because, as he explains, restricted resources do not permit the preparation of different books for each level. How familiar this problem is, and how well M. le Borgne overcomes it. The style of writing throughout is kept very simple but the trap of treating the subject matter superficially is avoided. Technical words are omitted as far as possible, but when they cannot be avoided, or when their acquisition is essential, an explanation is provided.

The presentation is of especial interest. At the head of each chapter a series of questions and problems is presented; the answers to these are to be found by a study of the text and illustrations which follow.

This method supports the author's contention that the teaching of geography is not simply a question of treating the class as so many empty buckets to be filled up with unrelated facts; matter must be so presented, and participation by the class must be such that in acquiring facts its members also become informed with a sense of geography. No doubt with younger children, teachers will make a selection from the questions, and will guide the children to forming answers; older children may be expected to work more on their own.

Throughout the book many paragraphs are printed in smaller type in which various points are developed in greater detail; these provide extra material either for the more advanced pupils or for the teacher. There is no doubt that on completing study of this book a student will have much more than a thorough knowledge of New Caledonia; he will have an excellent understanding of the foundations of the subject 'geography'.

Educationists will recognise with deep respect the amount of work which has gone into the making of this book; and on seeing the results no-one can doubt that here is a really splendid instrument for the schools. Our only small reservation is that we feel that such a book deserves a more robust binding; the spine is weak, and we wonder how long it will stand up to the rough and tumble of school use.

PREPARATORY TECHNICAL ENGLISH. G. A. Pittman. London: Longmans Green. Stg. 4s. 9d. pp. 175. Teachers Book Stg. 4s. 3d. pp. 71.

This book is not only of great practical value to teachers in technical and vocational training schools; it is also one which has particular significance in the general methodology of language teaching. In this latter respect we believe that its approach may also be of interest to teachers of French and Dutch.

As regards the teaching of English as a second language in Pacific Islands schools—as indeed elsewhere—the position is this: a child goes to school for a certain number of years where he takes a course in English. After a period—usually between 8 and 12 years but sometimes a little less—he may move on to some form of vocational, technical, or professional training in such fields as carpentry and building,

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346 LITTLE COLLINS STREET MELBOURNE

or agriculture, native police, medicine, teaching, and so on. Here, in spite of the fact that he may have "passed in English" at school very well indeed, it is often found that his command of the language is not adequate to meet the needs of the technical training which he is now undergoing. The staff at the training institution therefore feels it is necessary for them to give their students a "brush-up" course in English, and often blames the schools for their students' inadequacies.

What has happened, of course, is that because of the limitations of time and staff during their school days, the students have undergone a course in English which is necessarily confined to the limits of a scientifically selected and restricted vocabulary; and also their English is inevitably still a little bookish.

Unless students spend more years at school and a lot more time on English, and the schools are staffed with far more teachers whose mother tongue is English, there is no escaping this difficulty, and it is thus irrational for training colleges to blame the schools. We therefore have to fall back on the idea of giving a "brush-up" course in English. Here again we are faced with a problem. It is not simply a question of the student learning the meaning of a large number of technical words and terms. Neither is it practicable or useful for him to continue a general study of "literary" and "grammatical" English. This might help if he had several years at his disposal for an intensive study of English, but he has not. The immediate and practical problem is to widen the student's grasp of English to enable him to deal with the new concepts of his vocation. He needs a greater flexibility of speech and understanding within the context of his particular work; and he must be helped to read about his subject in the technical books and papers of his chosen profession.

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A fascinating book about the growth and work of the English primary school. "Its influence upon senior pupils who might think of teaching as a career could be profound. The book has much to say to any parent who may study its pages, and it will be of immediate and lasting value to students in training colleges." — *The Times Educational Supplement.* *10s. 6d.*

George G. Harrap & Co. Ltd.

182 HIGH HOLBORN, LONDON, W.C.1

As we all know, the written and spoken word are two very different things, and the author of this book gives some interesting examples of this in his preface, e.g.:

> Perhaps one of his worst difficulties in studying is that the English he hears in the workshop is very different from the English he reads in the books about his trade.
>
> | He will *hear* this kind of English in the workshop. | He will *read* this kind of English in books about his trade |
> |---|---|
> | Turn it round | Reverse it, revolve it |
> | Put it back | Replace it. |
> | Put it down | Deposit it |
> | Put it out | Extinguish it |
> | Put it against . . . | Apply it to . . . |
> | Fill it up | Replenish it |

Pittman attacks the problem by a development of the situational method of language teaching. By placing his situations in contexts which actually arise in the subject matter of the student's studies, he draws together the two aspects of the problem, i.e., he is able to combine the development of the student's grasp of English with his practical technical training. The two become one.

This is a unique book, and I venture to say that no-one who is in any way concerned with technical or vocational training of students, in a language which is not their mother tongue, can afford to miss it. The author is Director of Education in Nauru, where he has carried out intensive research on this problem, and was closely associated with the development of English courses for non-English speaking newcomers to Australia.

PAWIDU. D. Powys. Port Moresby: Dominie (New Guinea). A.2s. 9d. pp. 32.

It is good to see books specially written for leisure reading by island children. Most of the reading material at present available to them is didactic, of the "wash behind the ears" and "be thrifty" type, but one sometimes feels the cause of literacy would be better served if there were something a bit more exciting for island youngsters to read. How many European children lie on their tummies at home reading a good hygiene book or about wild adventures in a savings bank? And how far would our own teachers get if children never had anything to read at home? *Pawidu* is a simple adventure story about a Melanesian schoolboy. He rescues another boy from drowning; he goes to school where he is a stranger, and gets mixed up in a fight; the boy he rescued helps him; and finally he makes the school football team, and wins the match for his school. All very "European" in concept and motivation, but why not? The setting and the adventures would be familiar to any Melanesian schoolboy, and probably to children in other islands also.

The author and publisher are to be congratulated on their venture. If this review should catch the eye of anyone who hopes there will be more and better leisure reading material for islanders, please remember that such a happy development can only come about if people buy copies, and help islanders to buy copies. Books lying in an office, or on publishers' shelves, are like tombstones—they mark the death of past efforts and future hopes. *Pawidu* should be suitable for reading from about sixth year up.

HIGHWAY ARITHMETICS FOR PAPUA & NEW GUINEA. E. Carey Francis. London: Longmans Green; 1960. Price range, Stg. 1s. 1d. to 3s. 6d.

This series goes from Book 1 to Book 7, with a teacher's companion to each book. It has been specially adapted from an African series for use in Papua-New Guinea, so that the objects, articles, and situations which enter into the various problems are those with which Pacific islands children are familiar; for example:

> "A builder said that he would put up a new school for £400. 5 churches agreed to share the cost equally. How much must each church collect?"

There does not appear to be a great deal of difference between the various arithmetic syllabuses in the English-speaking islands of the Pacific (except in the U.S. Trust Territory), so that the series is well worth examination in these areas.

NEW GUINEA. Roger Joyce. Melbourne: Oxford University Press. A.4s. 0d. pp. 32. (Australian Explorers Series.)

Oxford University Press are putting out an authoritative series of little books in an "Australian Explorers" series. These provide interesting and worthwhile reading for Pacific island schools at about eighth year level and above. Some of the books in the series deal with areas, e.g., *Australia, New Guinea,* while others deal with explorers themselves, e.g., Blaxland, Stuart, Tasman, etc. In *New Guinea,* the volume which we have just read, the story is given by a series of highlights which the writer has moulded into a complete story.

The rivers, swamps and mountains of New Guinea are adequately described as a background for the adventures of the explorers. The European story, beginning in 1511, unrolled at a leisurely and haphazard pace till the days of Cook and d'Urville. Almost another century went by before missionaries and inland explorers navigated rivers and trekked up and over some of the world's most rugged country. The second half of the book covers various explorations.

Altogether, this book gives the reader a useful impression of the world's second largest island and its two million people, both still partially unknown to our modern civilized world. Exploration in New Guinea is in fact still taking place.

Several black and white portraits and other photographs of historical interest have been included.

STORIES OF OLD SAMOA. Fanaafi Ma'ia'i. Christchurch, N.Z.: Whitcombe & Tombs. pp. 48. Stg. 3s. 9d.

This little book contains ten traditional Samoan stories retold in English by a Samoan author. The language and the unfolding of these stories have a deceptive simplicity. It is not a question of artificial simplification for unsophisticated readers; the telling of them has more in common with that economy of means which is sought in so many of the arts today such as design, music, painting. As a result, the stories move at a pace which holds the reader's attention, yet they nevertheless reflect a quiet dignity and inner conviction that is wholly in keeping with their nature. The typographical arrangements of the book are highly commendable.

This publication points up an important problem in the Pacific. Here is a book by an island author entirely suited to the reading needs of middle-aged children (sic) and others in many territories. Yet how can they know of its existence and obtain copies? Education department budgets cannot meet all reading needs, and in any case, should reading only take place within the walls of schools? Here is a problem which only continued territorial attention can solve, and until it is solved the prices of books for island reading must remain on the high side.

OUR NEIGHBOURS IN NETHERLANDS NEW GUINEA by G. T. Roscoe. Jacaranda Press, Brisbane. 67 pages, illustrated. A.8/6.

The author, now Director of Education in Papua and New Guinea, with some twenty years of experience in that territory, is well qualified to give his impressions of Netherlands New Guinea. He notes points of similarity between the two New Guineas and also elaborates on their differences. It is interesting to learn how the Dutch system of education in Holland has given rise to a wholly-mission system of education in Netherlands New Guinea, whereas the deeply-

MOVING AROUND

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This book for Primary Schools deals with all kinds of methods of transporting men and goods, from the most primitive to the most modern and efficient. There is a separate chapter on each important means of transport. Although written specifically for Borneo, the book should be useful in all parts of the Pacific as an attractive general introduction to its subject. It is written in a style which should make learning from it easy, and is illustrated with 62 photographs and maps. *4s 3d*

THE GOSPEL IN PICTURES

Mary Devitt

This book consists of selected passages from the Gospels, making up a continuous narrative of the life of Christ. The text is taken from the Knox translation but is slightly simplified. Each passage is accompanied by a clear line drawing which the children can colour for themselves. *Published in association with BURNS & OATES LTD.*

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Fred. J. Schonell, M.A., PH.D., D.LITT.
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This adaptation of the well-known spelling list includes words needed by children in South East Asia. Approximately 3,300 everyday words have been carefully selected and graded throughout six groups suitable for children aged 7-12. Teachers may like to add other words of local significance. The words are arranged within the groups in small units for each of four days, with the fifth left free for revision of the week's work. These words constitute the basic material for curricula requirements in the Primary School and when a child has mastered them he can spell most of the words he wishes to write, and 80-90 per cent. of those found in the majority of books and newspapers. *1s 4d*

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St. Martin's Street, London, W.C.2

rooted Australian belief in secular schools has developed a somewhat different system in Papua and New Guinea.

The book makes interesting reading, especially for one acquainted with other parts of Melanesia. Throughout, the author has adopted a tolerant and sympathetic attitude to the problems of administration, while alluding to the fields where the Netherlands New Guinea policy has made advances beyond those of other contemporary governments.

Visual Aids

CLASSROOM DISPLAY MATERIAL. Alan Vincent. London: National Committee for Visual Aids in Education. Stg. 1s. 6d. pp. 36.

A great deal is heard in these days about the use of visual aids. In schools in the Pacific there are a good many difficulties in the way of using projected aids such as the film and filmstrip, so the use of non-projected aids—charts, flannelgraphs, models, etc.—deserves special attention.

This little book is of particular value. It deals entirely with non-projected aids, and is concerned primarily to describe materials and methods required in the production, display, and storage of such aids. It is not so much concerned with the various methods of using them, and this seems to fit in with Pacific needs where for the present the problem is more one of local production for special needs than one of use, which is often well understood.

The book contains a certain amount of advertising material and this is helpful, not only in providing information about various materials and pieces of apparatus which are useful in the preparation of visual aids, but also in indicating where they may be obtained. Publisher's address is 33 Queen Anne Street, London, W.1.

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GENERAL EDITOR: V. L. GRIFFITHS

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FILMSTRIPS: USE, EVALUATION AND PRODUCTION. Lefrane, Coppen, *et al.* Paris: Unesco. Stg. 3s. 6d. pp. 54.

This is the first volume in a new Unesco series, "Manuals on Adult and Youth Education". The book contains only 54 pages, and perhaps it is just this condensation that makes it so valuable, for it represents the practical conclusions of acknowledged experts, working in the field in tropical places, on small budgets. How better could one describe our own problem?

The book is refreshingly free from enthusiasm untempered by facts. It presents a good but balanced case for filmstrips; recognises their limitations; and then provides an excellent guide to their use, evaluation, and production without ever losing sight of the fact that the book is addressed to people who work in places which definitely do not have "all mod. cons." Although it indicates how materials can be produced reasonably cheaply, and gives several guides to home-made apparatus, the book rightly indicates that there is a minimum of staff and materials without which the production of one's own materials cannot effectively proceed very far.

AURAL AIDS IN LANGUAGE TEACHING. Peter Strevens. London: Longmans Green. Stg. 3s. 0d. pp. 44.

Increasing interest is being shown in the use of aural aids such as the gramophone and tape recorder for language teaching. Several enquirers wanting to know what is available to assist with the teaching of English will find that *Aural Aids in Language Teaching* provides an excellent guide.

An introduction is followed by sections on the function of aural aids, techniques of using them, advice on buying them, and information about their upkeep in tropical climates. Finally, there is a catalogue of available records suitable for use in teaching English. This catalogue is divided into sections covering technical records and language courses, records for use with young children, and records of English literature—prose, drama, and poetry. The book is published on behalf of the British Council.

Printing In The Cook Islands

Throughout the Pacific there are many small printing presses striving to meet the rather specialized needs of island printing. One of the big problems facing many of them is the printing of illustrations. It is a slow and expensive business having blocks made in the nearest metropolitan territory, but the problem of making one's own blocks usually daunts even the most enthusiastic amateur. Recent developments in litho-offset printing have solved many of these problems, but even to use this process one still needs special apparatus, including a process camera. In any case, almost all island printeries are at present equipped with letterpress rather than litho-offset equipment.

Mr. Ian Forbes, Government Printer in the Cook Islands, has built his own camera and makes his own blocks; the apparatus he uses is of the simplest, and is quite inexpensive compared with that of the usual commercial equivalent. Judging from the samples he has sent us the results are excellent. Mr. Forbes has very kindly supplied the Commission with a detailed description and drawings of his apparatus, as well as a step-by-step description of the methods he uses to make blocks. These will very shortly be reproduced by the Commission as a Technical Information Circular, and interested readers are invited to write to the South Pacific Commission for a copy (free).

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